

1 Execution time: 0:00:00.230598 ovlp:

```

(0.9983835983835985-0.0019350019350019565j)
2 Execution time: 0:00:00.233687 ovlp:
(0.9938979938979939+0.0010530010530009903j)
3 Execution time: 0:00:00.237458 ovlp:
(0.9862875862875864-0.0008982008982009182j)
4 Execution time: 0:00:00.242110 ovlp:
(0.9747063747063747-0.0009594009594009467j)
5 Execution time: 0:00:00.247820 ovlp:
(0.9606879606879606-0.0007866007866007552j)
6 Execution time: 0:00:00.254477 ovlp:
(0.9440127440127439-0.0003330003330003217j)
7 Execution time: 0:00:00.263229 ovlp:
(0.9254475254475254+0.00134820134820135j)
8 Execution time: 0:00:00.273144 ovlp:
(0.9024363024363025+0.000207000207000263j)
9 Execution time: 0:00:00.283971 ovlp:
(0.8764766764766765-0.0004014004014003536j)
x_points = [np.float64(0.0), np.float64(0.03), np.float64(0.06),
np.float64(0.09), np.float64(0.12), np.float64(0.15), np.float64(0.18),
np.float64(0.21), np.float64(0.24), np.float64(0.27)] y_points = [1.          +0.j
0.9983835983835985-0.00193500193500196j
0.9938979938979939+0.00105300105300099j
0.9862875862875864-0.00089820089820092j
0.9747063747063747-0.00095940095940095j
0.9606879606879606-0.00078660078660076j
0.9440127440127439-0.00033300033300032j
0.9254475254475254+0.00134820134820135j
0.9024363024363025+0.00020700020700026j
0.8764766764766765-0.00040140040140035j]
fit1: [ 0.0384378559942208 -11.829771682421574 ]
[ 0.03929253447485465 -7.676481104018236 0.03844785599422041
7.641202178211605 ] 6.601091976752653e-09
[ 0.3090709792073389 -2.7508768767285288 0.03843583041815227
-1.1549796595904973 1.3096552704459674 ] 7.594199516601862e-10
E_gs: -2.7508768767285288
test mps sampling took: (0.0013644695281982422, Counter({0: 6, 2: 4}))
truncated ham size: 16 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 336 2 qubit gates: 144
N gate: 336 dt: 0.03
1 Execution time: 0:00:03.453544 ovlp:
(0.9984339984339985-0.0014562014562015113j)
2 Execution time: 0:00:03.456041 ovlp:
(0.9938691938691939-0.0010026010026009669j)
3 Execution time: 0:00:03.459633 ovlp:
(0.9860859860859861-0.0004338004338004797j)
4 Execution time: 0:00:03.464069 ovlp:

```

```

(0.975037575037575-0.0007074007074007183j)
5 Execution time: 0:00:03.469294 ovlp:
(0.9612999612999613-0.0004518004518004881j)
6 Execution time: 0:00:03.475503 ovlp:
(0.9446247446247447+0.0030978030978030535j)
7 Execution time: 0:00:03.484053 ovlp:
(0.9252171252171253-0.0011214011214011332j)
8 Execution time: 0:00:03.492118 ovlp:
(0.9024327024327023+0.00021420021420026636j)
9 Execution time: 0:00:03.501161 ovlp:
(0.8775242775242775+0.00022140022140026971j)
x_points = [np.float64(0.0), np.float64(0.03), np.float64(0.06),
np.float64(0.09), np.float64(0.12), np.float64(0.15), np.float64(0.18),
np.float64(0.21), np.float64(0.24), np.float64(0.27)] y_points = [1.          +0.j
0.9984339984339985-0.00145620145620151j
0.9938691938691939-0.00100260100260097j
0.9860859860859861-0.00043380043380048j
0.975037575037575 -0.00070740070740072j
0.9612999612999613-0.00045180045180049j
0.9446247446247447+0.00309780309780305j
0.9252171252171253-0.00112140112140113j
0.9024327024327023+0.00021420021420027j
0.8775242775242775+0.00022140022140027j]
fit1: [ 0.03835384996587143 -11.804371520585192 ]
[ 0.04005966456312269 -7.5979102333098405  0.0383638499658696
 7.530092194541426 ] 6.088639733570244e-09
[ 0.27626979840207627 -3.0181895092395945  0.03832497814601222
-0.7141724139527653  1.1768357937514253 ] 1.834719385992997e-09
E_gs: -3.0181895092395945
test mps sampling took: (0.0013339519500732422, Counter({0: 6, 2: 4}))
truncated ham size: 16 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 336 2 qubit gates: 144
N gate: 336 dt: 0.13509016775062224
1 Execution time: 0:00:04.676057 ovlp:
(0.968407155770018-0.0013110018354025588j)
2 Execution time: 0:00:04.678620 ovlp:
(0.8774466284252798-0.0017618024665234655j)
3 Execution time: 0:00:04.682193 ovlp:
(0.7329972261961166-0.005653407914771091j)
4 Execution time: 0:00:04.687696 ovlp:
(0.5563569788997704+0.0024150033810046434j)
5 Execution time: 0:00:04.693717 ovlp:
(0.3500282900396061+0.0018170025438035697j)
6 Execution time: 0:00:04.700257 ovlp:
(0.1349963889949446-0.004439006214608687j)
7 Execution time: 0:00:04.709326 ovlp:

```

```

(-0.06510389114544757+0.0010902015262821418j)
8 Execution time: 0:00:04.718159 ovlp:
(-0.24464214249899952+0.0015410021574029376j)
9 Execution time: 0:00:04.727818 ovlp:
(-0.3993955591537828+0.0009430013202018639j)
10 Execution time: 0:00:04.738702 ovlp:
(-0.5167141233997727+0.0006026008436412766j)
11 Execution time: 0:00:04.750141 ovlp:
(-0.6049238468933856+0.0017802024922835002j)
12 Execution time: 0:00:04.762759 ovlp:
(-0.6518715126201177-0.000575000805001169j)
13 Execution time: 0:00:04.776201 ovlp:
(-0.670887939243115-0.0019090026726037435j)
14 Execution time: 0:00:04.791258 ovlp:
(-0.6610163254228556-0.0010902015262821418j)
15 Execution time: 0:00:04.805889 ovlp:
(-0.6256698759378263+0.001219001706602496j)
16 Execution time: 0:00:04.822164 ovlp:
(-0.5713437998813198-0.0009982013974819681j)
17 Execution time: 0:00:04.841176 ovlp:
(-0.5028037039251855+0.000216200302680436j)
18 Execution time: 0:00:04.861355 ovlp:
(-0.4181267853774995-0.0043562060986885864j)
19 Execution time: 0:00:04.880874 ovlp:
(-0.31336623871273417-0.0003174004443605716j)
20 Execution time: 0:00:04.902481 ovlp:
(-0.20916689283364998-0.001145401603562246j)
21 Execution time: 0:00:04.923283 ovlp:
(-0.0885179239250935+0.0034270047978066653j)
22 Execution time: 0:00:04.945494 ovlp:
(0.028119839367775068-0.0019918027885239553j)
23 Execution time: 0:00:04.968833 ovlp:
(0.14254959956943947-0.0029210040894057654j)
x_points = [np.float64(0.0), np.float64(0.13509016775062224),
np.float64(0.2701803355012445), np.float64(0.40527050325186675),
np.float64(0.540360671002489), np.float64(0.6754508387531112),
np.float64(0.8105410065037335), np.float64(0.9456311742543557),
np.float64(1.080721342004978), np.float64(1.2158115097556002),
np.float64(1.3509016775062224), np.float64(1.4859918452568446),
np.float64(1.621082013007467), np.float64(1.7561721807580892),
np.float64(1.8912623485087114), np.float64(2.0263525162593337),
np.float64(2.161442684009956), np.float64(2.296532851760578),
np.float64(2.4316230195112003), np.float64(2.5667131872618225),
np.float64(2.7018033550124447), np.float64(2.836893522763067),
np.float64(2.971983690513689), np.float64(3.1070738582643114)] y_points =
[ 1.          +0.j
 0.968407155770018 -0.00131100183540256j

```

0.8774466284252798 -0.00176180246652347j
 0.7329972261961166 -0.00565340791477109j
 0.5563569788997704 +0.00241500338100464j
 0.3500282900396061 +0.00181700254380357j
 0.1349963889949446 -0.00443900621460869j
 -0.06510389114544757+0.00109020152628214j
 -0.24464214249899952+0.00154100215740294j
 -0.3993955591537828 +0.00094300132020186j
 -0.5167141233997727 +0.00060260084364128j
 -0.6049238468933856 +0.0017802024922835j
 -0.6518715126201177 -0.00057500080500117j
 -0.670887939243115 -0.00190900267260374j
 -0.6610163254228556 -0.00109020152628214j
 -0.6256698759378263 +0.0012190017066025j
 -0.5713437998813198 -0.00099820139748197j
 -0.5028037039251855 +0.00021620030268044j
 -0.4181267853774995 -0.00435620609868859j
 -0.31336623871273417-0.00031740044436057j
 -0.20916689283364998-0.00114540160356225j
 -0.0885179239250935 +0.00342700479780667j
 0.02811983936777507-0.00199180278852396j
 0.14254959956943947-0.00292100408940577j]
 fit1: [0.6542760574553106 -1.572941556338694]
 [0.3960122755441523 -2.347389366480731 0.4545797393663541
 -1.1267892320449453] 1.0338729200890449
 [0.33759286791107185 -2.214638429831387 0.37837848547706526
 -1.0982014156841176 0.8071872925392861] 0.3279732079033518
 E_gs: -2.214638429831387
 test mps sampling took: (0.0013420581817626953, Counter({2: 7, 0: 3}))
 truncated ham size: 16 Number of fitting points: 25
 shots per matrix element: 208333.0
 Total gate count: 336 2 qubit gates: 144
 N gate: 336 dt: 0.06495125739391722
 1 Execution time: 0:00:07.367936 ovlp:
 (0.9927903884646216-0.003489605583368971j)
 2 Execution time: 0:00:07.370448 ovlp:
 (0.9710175536280858+0.002241603586565777j)
 3 Execution time: 0:00:07.374015 ovlp:
 (0.9353918966270347-0.0011088017740827905j)
 4 Execution time: 0:00:07.378461 ovlp:
 (0.8852798164477063+0.001579202526724055j)
 5 Execution time: 0:00:07.383662 ovlp:
 (0.8234461175137879+0.0002544004070406114j)
 6 Execution time: 0:00:07.389910 ovlp:
 (0.751964403143045-0.0004944007910412385j)
 7 Execution time: 0:00:07.396905 ovlp:
 (0.670709873135797+0.0032208051532882642j)

```

8 Execution time: 0:00:07.404749  ovlp:
(0.5782713252341203-0.0038448061516898058j)
9 Execution time: 0:00:07.413414  ovlp:
(0.4857079771327635-0.0010608016972827317j)
10 Execution time: 0:00:07.424880  ovlp:
(0.389083822534116-0.00011040017664032398j)
11 Execution time: 0:00:07.435858  ovlp:
(0.2905588648941839+0.0018960030336048206j)
12 Execution time: 0:00:07.447598  ovlp:
(0.1846226953963126+0.0001296002073603031j)
13 Execution time: 0:00:07.462986  ovlp:
(0.08180653089044942+0.003288005260808413j)
14 Execution time: 0:00:07.477705  ovlp:
(-0.015662425059880136-0.003163205061128105j)
15 Execution time: 0:00:07.493240  ovlp:
(-0.1092529748047597+0.0008496013593621843j)
16 Execution time: 0:00:07.509370  ovlp:
(-0.1973235157176252+0.002395203832326054j)
17 Execution time: 0:00:07.526380  ovlp:
(-0.27673484277574845+0.00024480039168062184j)
18 Execution time: 0:00:07.546749  ovlp:
(-0.35261336418138267+0.0013968022348835873j)
19 Execution time: 0:00:07.567982  ovlp:
(-0.4225302760484416+0.0018288029260846717j)
20 Execution time: 0:00:07.589115  ovlp:
(-0.47868076588922537-0.002500804001286383j)
21 Execution time: 0:00:07.611890  ovlp:
(-0.5301944483111173-0.00437280699649123j)
22 Execution time: 0:00:07.634477  ovlp:
(-0.5711865138984222-0.0007824012518420354j)
23 Execution time: 0:00:07.658350  ovlp:
(-0.6048825678121085-0.0028848046156874085j)
24 Execution time: 0:00:07.683662  ovlp:
(-0.6321946115113783-0.004718407549452075j)
x_points = [np.float64(0.0), np.float64(0.06495125739391722),
np.float64(0.12990251478783443), np.float64(0.19485377218175165),
np.float64(0.25980502957566887), np.float64(0.3247562869695861),
np.float64(0.3897075443635033), np.float64(0.4546588017574205),
np.float64(0.5196100591513377), np.float64(0.584561316545255),
np.float64(0.6495125739391722), np.float64(0.7144638313330893),
np.float64(0.7794150887270066), np.float64(0.8443663461209239),
np.float64(0.909317603514841), np.float64(0.9742688609087582),
np.float64(1.0392201183026755), np.float64(1.1041713756965927),
np.float64(1.16912263309051), np.float64(1.234073890484427),
np.float64(1.2990251478783443), np.float64(1.3639764052722616),
np.float64(1.4289276626661787), np.float64(1.493878920060096),
np.float64(1.5588301774540132)] y_points = [ 1.          +0.j

```

0.9927903884646216 -0.00348960558336897j
0.9710175536280858 +0.00224160358656578j
0.9353918966270347 -0.00110880177408279j
0.8852798164477063 +0.00157920252672406j
0.8234461175137879 +0.00025440040704061j
0.751964403143045 -0.00049440079104124j
0.670709873135797 +0.00322080515328826j
0.5782713252341203 -0.00384480615168981j
0.4857079771327635 -0.00106080169728273j
0.389083822534116 -0.00011040017664032j
0.2905588648941839 +0.00189600303360482j
0.1846226953963126 +0.0001296002073603j
0.08180653089044942+0.00328800526080841j
-0.01566242505988014-0.0031632050611281j
-0.1092529748047597 +0.00084960135936218j
-0.1973235157176252 +0.00239520383232605j
-0.27673484277574845+0.00024480039168062j
-0.35261336418138267+0.00139680223488359j
-0.4225302760484416 +0.00182880292608467j
-0.47868076588922537-0.00250080400128638j
-0.5301944483111173 -0.00437280699649123j
-0.5711865138984222 -0.00078240125184204j
-0.6048825678121085 -0.00288480461568741j
-0.6321946115113783 -0.00471840754945207j]
fit1: [0.5711752073646437 -2.327858462458674]
[0.4022323503142668 -2.013124573067089 0.4021664240426996
2.0088622358345676] 7.154842989334849e-07
[0.3766771538890616 -2.0806817246524933 0.2022525188074729
-0.2856346952318704 1.9510684840946493] 8.646036070672692e-07
E_gs: -2.0806817246524933
test mps sampling took: (0.0013322830200195312, Counter({2: 6, 0: 4}))
truncated ham size: 16 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 336 2 qubit gates: 144
N gate: 336 dt: 0.10709655585308417
1 Execution time: 0:00:08.389589 ovlp:
(0.9802863684581895-0.003667205867529333j)
2 Execution time: 0:00:08.392078 ovlp:
(0.921462274339639+0.00153600245760388j)
3 Execution time: 0:00:08.396108 ovlp:
(0.8281693250709201-0.001051201681922742j)
4 Execution time: 0:00:08.400740 ovlp:
(0.7075547320875712+0.0007008011212819021j)
5 Execution time: 0:00:08.407062 ovlp:
(0.5591096945755114+0.0006960011136016853j)
6 Execution time: 0:00:08.413999 ovlp:
(0.400387840620545+0.0029280046848074726j)

```

7 Execution time: 0:00:08.421656 ovlp:
(0.2335107736172377+0.0013536021657634123j)
8 Execution time: 0:00:08.431170 ovlp:
(0.06453610325776515+0.001315202104323454j)
9 Execution time: 0:00:08.441188 ovlp:
(-0.09209294734871576+0.0013728021964836135j)
10 Execution time: 0:00:08.453013 ovlp:
(-0.2371299794079671+0.0017904028646444914j)
11 Execution time: 0:00:08.464829 ovlp:
(-0.36337978140765026+0.0008064012902420092j)
12 Execution time: 0:00:08.478444 ovlp:
(-0.467203947526316-0.0005616008985613874j)
x_points = [np.float64(0.0), np.float64(0.10709655585308417),
np.float64(0.21419311170616834), np.float64(0.3212896675592525),
np.float64(0.4283862234123367), np.float64(0.5354827792654209),
np.float64(0.642579335118505), np.float64(0.7496758909715892),
np.float64(0.8567724468246734), np.float64(0.9638690026777575),
np.float64(1.0709655585308417), np.float64(1.1780621143839258),
np.float64(1.28515867023701)] y_points = [ 1.          +0.j
0.9802863684581895 -0.00366720586752933j
0.921462274339639 +0.00153600245760388j
0.8281693250709201 -0.00105120168192274j
0.7075547320875712 +0.0007008011212819j
0.5591096945755114 +0.00069600111360169j
0.400387840620545 +0.00292800468480747j
0.2335107736172377 +0.00135360216576341j
0.06453610325776515+0.00131520210432345j
-0.09209294734871576+0.00137280219648361j
-0.2371299794079671 +0.00179040286464449j
-0.36337978140765026+0.00080640129024201j
-0.467203947526316 -0.00056160089856139j]
fit1: [ 0.49352594637411235 -2.6824380579397955 ]
[ 0.3857465664545551 -2.086258643446614 0.38451909101213755
2.086162306647477 ] 7.314926005688292e-09
[ 0.3150164027830161 -2.259730619076273 0.26014452476149147
-0.5787434862067221 1.971979889243527 ] 2.0853814322846915e-08
E_gs: -2.259730619076273
test mps sampling took: (0.001367330551147461, Counter({2: 6, 0: 4}))
truncated ham size: 16 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 336 2 qubit gates: 144
N gate: 336 dt: 0.1861800751137584
1 Execution time: 0:00:09.072701 ovlp:
(0.9417327766931107-0.0006396002558400893j)
2 Execution time: 0:00:09.075767 ovlp:
(0.7767807107122844+0.0004764001905601667j)
3 Execution time: 0:00:09.079373 ovlp:

```



```

(0.5328878131551253-0.0003060001224000075j)
4 Execution time: 0:00:09.084002  ovlp:
(0.24688689875475944+0.0003444001377601591j)
5 Execution time: 0:00:09.090064  ovlp:
(-0.03546121418448567-0.0015948006379202795j)
6 Execution time: 0:00:09.097288  ovlp:
(-0.2865565146226059+0.0006564002625601972j)
x_points = [np.float64(0.0), np.float64(0.1861800751137584),
np.float64(0.3723601502275168), np.float64(0.5585402253412752),
np.float64(0.7447203004550336), np.float64(0.9309003755687919),
np.float64(1.1170804506825505)] y_points = [ 1.          +0.j
0.9417327766931107 -0.00063960025584009j
0.7767807107122844 +0.00047640019056017j
0.5328878131551253 -0.00030600012240001j
0.24688689875475944+0.00034440013776016j
-0.03546121418448567-0.00159480063792028j
-0.2865565146226059 +0.0006564002625602j ]
fit1: [ 0.4367310762028223 -30.787761665813605 ]
[ 0.3766848865891593 -31.641644964384263  0.37626338221886735
-2.106800900388955 ] 3.040542767018931e-10
[ 4.9247568257461627e-01 -3.2023177984433318e+01
1.5126221719391786e-02
-1.6912727602658560e+01 -1.7246060175550535e+00]
4.2278732886596425e-06
E_gs: -32.02317798443332
test mps sampling took: (0.0014400482177734375, Counter({0: 6, 2: 4}))
truncated ham size: 16 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 336 2 qubit gates: 144
N gate: 336 dt: 0.23204477585097094
1 Execution time: 0:00:09.638527  ovlp:
(0.9113983999999999+0.0008943999999999619j)
2 Execution time: 0:00:09.641003  ovlp:
(0.6670096000000001+0.0005759999999999099j)
3 Execution time: 0:00:09.645614  ovlp:
(0.32893440000000007-4.4799999999955986e-05j)
4 Execution time: 0:00:09.650095  ovlp:
(-0.025716799999999984+0.000235200000000102j)
x_points = [np.float64(0.0), np.float64(0.23204477585097094),
np.float64(0.4640895517019419), np.float64(0.6961343275529128),
np.float64(0.9281791034038838)] y_points = [ 1.
+0.0000000000000000e+00j
0.9113983999999999 +8.9439999999996189e-04j
0.6670096000000001 +5.7599999999990992e-04j
0.32893440000000007-4.4799999999955986e-05j
-0.02571679999999998+2.3520000000010199e-04j]
fit1: [ 0.3539961139853999 -3.4619179920488623]

```

[0.35517927703035446 -2.1919810761007708 0.3535987708760839
2.1800799733100926] 1.5875566136865568e-10
[0.3021900310791303 -2.0048084945231723 0.17241686833804085
-2.0040814925025527 1.4401950590620956] 1.6010975273729496e-05
E_gs: -2.0048084945231723
test mps sampling took: (0.0013835430145263672, Counter({0: 5, 2: 5}))
truncated ham size: 16 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 336 2 qubit gates: 144
N gate: 336 dt: 0.2461936152275512
1 Execution time: 0:00:10.031761 ovlp:
(0.900594881903622-0.0038192122214790736j)
2 Execution time: 0:00:10.034150 ovlp:
(0.6312260199232638+0.0014432046182548675j)
3 Execution time: 0:00:10.037551 ovlp:
(0.2644320461825478-0.0021296068147418357j)
4 Execution time: 0:00:10.041840 ovlp:
(-0.10593473899116479+0.0014256045619345237j)
5 Execution time: 0:00:10.047248 ovlp:
(-0.40362209159069307-0.0006776021683269073j)
6 Execution time: 0:00:10.053433 ovlp:
(-0.5933858988348762-0.0017952057446584124j)
7 Execution time: 0:00:10.060540 ovlp:
(-0.6710725474321517+0.0003080009856031296j)
8 Execution time: 0:00:10.068406 ovlp:
(-0.647646872469992-0.0030624097997113964j)
9 Execution time: 0:00:10.078533 ovlp:
(-0.5504417614136365+0.000976803125769976j)
10 Execution time: 0:00:10.089562 ovlp:
(-0.398826076243444+0.00022000070400229887j)
11 Execution time: 0:00:10.100463 ovlp:
(-0.20454785455313462-0.00040480129536413223j)
12 Execution time: 0:00:10.112090 ovlp:
(0.003872012390439661+0.001188003801612103j)
13 Execution time: 0:00:10.124307 ovlp:
(0.19276461684677382-0.002041606533140894j)
14 Execution time: 0:00:10.137596 ovlp:
(0.31509380830018663-0.0006160019712062592j)
15 Execution time: 0:00:10.151983 ovlp:
(0.33757788024921687-7.0400225280709e-05j)
16 Execution time: 0:00:10.169311 ovlp:
(0.25482241543172934-0.0011616037171319205j)
17 Execution time: 0:00:10.187705 ovlp:
(0.09790031328100257-0.0020680066176211875j)
18 Execution time: 0:00:10.206312 ovlp:
(-0.05769298461755079+0.0009328029849695607j)
19 Execution time: 0:00:10.226083 ovlp:

```

(-0.14883487627160408-0.0011088035481713332j)
20 Execution time: 0:00:10.247603  ovlp:
(-0.13398042873737193+0.0020592065894611267j)
21 Execution time: 0:00:10.268035  ovlp:
(-0.0071896230067935996-0.0008888028441691453j)
22 Execution time: 0:00:10.290717  ovlp:
(0.19508782428103766+0.0020064064205005394j)
x_points = [np.float64(0.0), np.float64(0.2461936152275512),
np.float64(0.4923872304551024), np.float64(0.7385808456826536),
np.float64(0.9847744609102048), np.float64(1.230968076137756),
np.float64(1.4771616913653072), np.float64(1.7233553065928584),
np.float64(1.9695489218204096), np.float64(2.215742537047961),
np.float64(2.461936152275512), np.float64(2.7081297675030633),
np.float64(2.9543233827306143), np.float64(3.200516997958166),
np.float64(3.446710613185717), np.float64(3.6929042284132683),
np.float64(3.9390978436408193), np.float64(4.18529145886837),
np.float64(4.431485074095922), np.float64(4.677678689323473),
np.float64(4.923872304551024), np.float64(5.170065919778575),
np.float64(5.416259535006127)] y_points = [ 1.
+0.000000000000000000e+00j
 0.900594881903622 -3.8192122214790736e-03j
 0.6312260199232638 +1.4432046182548675e-03j
 0.2644320461825478 -2.1296068147418357e-03j
-0.10593473899116479+1.4256045619345237e-03j
-0.40362209159069307-6.7760216832690734e-04j
-0.5933858988348762 -1.7952057446584124e-03j
-0.6710725474321517 +3.0800098560312961e-04j
-0.647646872469992 -3.0624097997113964e-03j
-0.5504417614136365 +9.7680312576997608e-04j
-0.398826076243444 +2.2000070400229887e-04j
-0.20454785455313462-4.0480129536413223e-04j
 0.00387201239043966+1.1880038016121031e-03j
 0.19276461684677382-2.0416065331408939e-03j
 0.31509380830018663-6.1600197120625921e-04j
 0.33757788024921687-7.0400225280708995e-05j
 0.25482241543172934-1.1616037171319205e-03j
 0.09790031328100257-2.0680066176211875e-03j
-0.05769298461755079+9.3280298496956071e-04j
-0.14883487627160408-1.1088035481713332e-03j
-0.13398042873737193+2.0592065894611267e-03j
-0.0071896230067936 -8.8880284416914535e-04j
 0.19508782428103766+2.0064064205005394e-03j]
fit1: [ 0.6181662097770817 -23.756746069688408 ]
[ 0.3677100539623758 -23.782078602016895 0.3674113512893997
-1.7308256744001491] 0.6140757662372782
[ 0.3562028362709942 -23.953896962466867 0.24151575153180904
-12.572946325624418 -1.6280540711146374 ] 0.5035304485584234

```

```

E_gs: -23.953896962466867
test mps sampling took: (0.0013756752014160156, Counter({0: 7, 2: 3}))
truncated ham size: 16 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 336 2 qubit gates: 144
N gate: 336 dt: 0.06440936476006781
1 Execution time: 0:00:11.487753 ovlp:
(0.992812+0.00017599999999995397j)
2 Execution time: 0:00:11.490237 ovlp:
(0.9713259999999999-0.0006319999999999659j)
3 Execution time: 0:00:11.493793 ovlp:
(0.935948+3.20000000000032e-05j)
4 Execution time: 0:00:11.498611 ovlp:
(0.887014+0.0008459999999999024j)
5 Execution time: 0:00:11.503830 ovlp:
(0.826992-0.00047799999999997844j)
x_points = [np.float64(0.0), np.float64(0.06440936476006781),
np.float64(0.12881872952013562), np.float64(0.19322809428020343),
np.float64(0.25763745904027124), np.float64(0.32204682380033905)]
y_points = [1. +0.0000000000000000e+00j
0.992812 +1.7599999999995397e-04j
0.9713259999999999-6.3199999999996592e-04j
0.935948 +3.20000000000032003e-05j
0.887014 +8.4599999999990239e-04j
0.826992 -4.7799999999997844e-04j]
fit1: [ 0.05699818035176726 -9.775102440663606 ]
[ 0.05947422454924813 -6.355125038842725 0.05700818035176725
5.951444059171433 ] 1.2022366835082814e-08
[ 0.3234355227264349 -2.485666567487981 0.05684635819984144
-2.0302669252603547 1.4111517149172665 ] 8.021310838529636e-10
E_gs: -2.485666567487981
test mps sampling took: (0.0014243125915527344, Counter({2: 6, 0: 4}))
truncated ham size: 16 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 336 2 qubit gates: 144
N gate: 336 dt: 0.18629493128886018
1 Execution time: 0:00:12.210762 ovlp:
(0.9417120000000001+0.000111999999999988997j)
2 Execution time: 0:00:12.213451 ovlp:
(0.7758719999999999+0.000272000000000005j)
3 Execution time: 0:00:12.217260 ovlp:
(0.5322880000000001+0.0008239999999999359j)
4 Execution time: 0:00:12.221757 ovlp:
(0.24639999999999995+0.00182400000000000478j)
5 Execution time: 0:00:12.227219 ovlp:
(-0.0351040000000000024+0.0030879999999999797j)
6 Execution time: 0:00:12.233436 ovlp:

```

```

(-0.286848-0.0028639999999999777j)
7 Execution time: 0:00:12.240444  ovlp:
(-0.476767999999999997-0.00057600000000000209j)
8 Execution time: 0:00:12.248262  ovlp:
(-0.601704-0.0047599999999999865j)
9 Execution time: 0:00:12.258214  ovlp:
(-0.664408-0.00135200000000000199j)
10 Execution time: 0:00:12.269214  ovlp:
(-0.66370400000000001-0.0010480000000000049j)
11 Execution time: 0:00:12.282187  ovlp:
(-0.618368-0.00092800000000000399j)
12 Execution time: 0:00:12.295150  ovlp:
(-0.53946399999999999-0.00190400000000000168j)
13 Execution time: 0:00:12.308918  ovlp:
(-0.427048-0.0002720000000000005j)
14 Execution time: 0:00:12.324828  ovlp:
(-0.285408+0.000343999999999989994j)
15 Execution time: 0:00:12.341923  ovlp:
(-0.128672+0.0028399999999999537j)
16 Execution time: 0:00:12.360277  ovlp:
(0.033071999999999999+0.0025759999999999117j)
17 Execution time: 0:00:12.376820  ovlp:
(0.179504000000000001+0.00035999999999991594j)
18 Execution time: 0:00:12.397314  ovlp:
(0.295231999999999994+0.00080799999999999199j)
19 Execution time: 0:00:12.417573  ovlp:
(0.360224000000000001-0.0015439999999999898j)
20 Execution time: 0:00:12.437551  ovlp:
(0.350632000000000005+0.00179200000000000158j)
x_points = [np.float64(0.0), np.float64(0.18629493128886018),
np.float64(0.37258986257772037), np.float64(0.5588847938665805),
np.float64(0.7451797251554407), np.float64(0.9314746564443009),
np.float64(1.117769587733161), np.float64(1.3040645190220213),
np.float64(1.4903594503108815), np.float64(1.6766543815997417),
np.float64(1.8629493128886019), np.float64(2.049244244177462),
np.float64(2.235539175466322), np.float64(2.4218341067551825),
np.float64(2.6081290380440425), np.float64(2.794423969332903),
np.float64(2.980718900621763), np.float64(3.167013831910623),
np.float64(3.3533087631994833), np.float64(3.5396036944883433),
np.float64(3.7258986257772038)] y_points = [ 1.          +0.j
0.941712000000000001 +0.000111999999999989j
0.77587199999999999 +0.000272000000000005j
0.532288000000000001 +0.000823999999999994j
0.246399999999999995+0.001824000000000005j
-0.035104000000000002+0.003087999999999998j
-0.286848          -0.002863999999999998j
-0.476767999999999997-0.000576000000000002j

```

```
-0.601704      -0.00475999999999999j  
-0.664408      -0.001352000000000002j  
-0.66370400000000001 -0.001048000000000005j  
-0.618368      -0.000928000000000004j  
-0.53946399999999999 -0.001904000000000002j  
-0.427048      -0.000272000000000005j  
-0.285408      +0.000343999999999999j  
-0.128672      +0.002839999999999995j  
0.03307199999999999+0.002575999999999991j  
0.17950400000000001 +0.000359999999999992j  
0.29523199999999994+0.000807999999999992j  
0.36022400000000001 -0.00154399999999999j  
0.350632000000000005+0.001792000000000002j]  
fit1: [ 0.6387552492518048 -32.16665561893251 ]  
[ 0.247544941736867 -31.09880664558843 0.5226796356631829  
1.497377049697135 ] 0.6744364417731057  
[ 0.5368835608569206 -31.87975443469698 0.17713930996538094  
-15.257558010817478 0.6779083550339327 ] 0.8807079604364206  
E_gs: -31.87975443469698  
Data written successfully to 04qubits_05A.X.data  
Data written successfully to 04qubits_05A.Y.data  
>> Miner succeeded! Mined 10 records  
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>  
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>  
Running kcl_adapt_vqe_stage_1.py with prefix 04qubits_05  
res=miner(n_qubits, ham, repeats, 5, X_file, Y_file,  
generate_hyper_params_avqe, wrapper_avqe, compress_avqe)  
Resolving package versions...  
No Changes to `~/.julia/environments/pyjuliapkg/Project.toml`  
No Changes to `~/.julia/environments/pyjuliapkg/Manifest.toml`  
Resolving package versions...  
No Changes to `~/.julia/environments/pyjuliapkg/Project.toml`  
No Changes to `~/.julia/environments/pyjuliapkg/Manifest.toml`  
test mps sampling took: (24.105059146881104, Counter({0: 8, 2: 2}))  
/usr/local/lib/python3.10/site-packages/stopit/__init__.py:10: UserWarning:  
pkg_resources is deprecated as an API. See https://setuptools.pypa.io/en/  
latest/pkg_resources.html. The pkg_resources package is slated for removal as  
early as 2025-11-30. Refrain from using this package or pin to Setuptools<81.  
import pkg_resources  
>> Start Stage 1  
>> Read ham ../hamiltonian/, 04qubits_05.data  
04qubits_05  
>> Start processing: 04qubits_05.data with qubits 4  
>> Running Miner  
>>>> adding ham of size 272  
iteration: 1  
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
```

θ : [-0.7853981643835831]
QSCI energy: -3.661812831373912, (new generator X1 Y2)
iteration: 2
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
 θ : [-0.8380969751184906]
QSCI energy: -5.251192387396458, (new generator X1 Y3)
iteration: 3
new generator: ['1.0', 'X0 X1 Y2 X3'], index: 4 out of 5. # precise gradient: 5
 θ : [0.]
index 4 added to ignored list
QSCI energy: -5.251192387396456, (new generator X0 X1 Y2 X3)
iteration: 4
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
FUSED: ('X1 Y2', 'X1 Y2')
 θ : [0.]
index 2 added to ignored list
QSCI energy: -5.251192387396456, (new generator X1 Y2)
iteration: 1
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
 θ : [-0.7853981643835831]
QSCI energy: -3.661812831373912, (new generator X1 Y2)
iteration: 2
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
 θ : [-0.8380969751184906]
QSCI energy: -5.251192387396458, (new generator X1 Y3)
iteration: 3
new generator: ['1.0', 'X0 X1 Y2 X3'], index: 4 out of 5. # precise gradient: 5
 θ : [0.]
index 4 added to ignored list
QSCI energy: -5.251192387396458, (new generator X0 X1 Y2 X3)
iteration: 4
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
FUSED: ('X1 Y3', 'X1 Y3')
 θ : [0.]
index 3 added to ignored list
QSCI energy: -5.251192387396458, (new generator X1 Y3)
iteration: 1
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
 θ : [-0.7853981643835831]
QSCI energy: -3.661812831373912, (new generator X1 Y2)
iteration: 2
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
 θ : [-0.8380969751184906]
QSCI energy: -4.1812076013045765, (new generator X1 Y3)
iteration: 3
new generator: ['1.0', 'X0 Y1 X2 X3'], index: 4 out of 5. # precise gradient: 5
 θ : [-0.25651718024648035]

QSCI energy: -4.72877117556295, (new generator X0 Y1 X2 X3)
iteration: 4
selected second largest gradient
index 4 added to ignored list
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
FUSED: ('X1 Y2', 'X1 Y2')
 θ : [0.]
index 2 added to ignored list
QSCI energy: -4.728771175562951, (new generator X1 Y2)
iteration: 5
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
FUSED: ('X1 Y3', 'X1 Y3')
 θ : [0.]
index 3 added to ignored list
QSCI energy: -4.728771175562951, (new generator X1 Y3)
iteration: 1
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
 θ : [-0.7853981643835831]
QSCI energy: -3.661812831373912, (new generator X1 Y2)
iteration: 2
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
 θ : [-0.8380969751184906]
QSCI energy: -4.1812076013045765, (new generator X1 Y3)
iteration: 3
new generator: ['1.0', 'X0 Y2'], index: 0 out of 5. # precise gradient: 5
 θ : [-0.09167295304496374]
QSCI energy: -4.72877117556295, (new generator X0 Y2)
iteration: 4
new generator: ['1.0', 'X0 X1 X2 Y3'], index: 4 out of 5. # precise gradient: 5
 θ : [0.]
index 4 added to ignored list
QSCI energy: -4.728771175562951, (new generator X0 X1 X2 Y3)
iteration: 5
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
FUSED: ('X1 Y2', 'X1 Y2')
 θ : [0.]
index 2 added to ignored list
QSCI energy: -4.72877117556295, (new generator X1 Y2)
iteration: 1
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
 θ : [-0.7853981643835831]
QSCI energy: -3.661812831373912, (new generator X1 Y2)
iteration: 2
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
 θ : [-0.8380969751184906]
QSCI energy: -5.251192387396458, (new generator X1 Y3)
iteration: 3

new generator: ['1.0', 'X0 Y1 X2 X3'], index: 4 out of 5. # precise gradient: 5
θ: [0.]
index 4 added to ignored list
QSCI energy: -5.251192387396458, (new generator X0 Y1 X2 X3)
iteration: 4
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
FUSED: ('X1 Y3', 'X1 Y3')
θ: [0.]
index 3 added to ignored list
QSCI energy: -5.251192387396458, (new generator X1 Y3)
iteration: 1
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
θ: [-0.7853981643835831]
QSCI energy: -3.661812831373912, (new generator X1 Y2)
iteration: 2
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
θ: [-0.8380969751184906]
QSCI energy: -5.251192387396458, (new generator X1 Y3)
iteration: 3
new generator: ['1.0', 'X0 X1 X2 Y3'], index: 4 out of 5. # precise gradient: 5
θ: [0.]
index 4 added to ignored list
QSCI energy: -5.251192387396456, (new generator X0 X1 X2 Y3)
iteration: 4
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
FUSED: ('X1 Y2', 'X1 Y2')
θ: [0.]
index 2 added to ignored list
QSCI energy: -5.251192387396458, (new generator X1 Y2)
iteration: 5
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
FUSED: ('X1 Y3', 'X1 Y3')
θ: [0.]
index 3 added to ignored list
QSCI energy: -5.251192387396458, (new generator X1 Y3)
iteration: 6
new generator: ['1.0', 'X0 Y3'], index: 1 out of 5. # precise gradient: 5
θ: [0.]
index 1 added to ignored list
QSCI energy: -5.251192387396456, (new generator X0 Y3)
iteration: 1
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
θ: [-0.7853981643835831]
QSCI energy: -3.661812831373912, (new generator X1 Y2)
iteration: 2
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
θ: [-0.8380969751184906]

QSCI energy: -5.251192387396456, (new generator X1 Y3)
iteration: 3
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
FUSED: ('X1 Y2', 'X1 Y2')
 θ : [0.]
index 2 added to ignored list
QSCI energy: -5.251192387396456, (new generator X1 Y2)
iteration: 4
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
FUSED: ('X1 Y3', 'X1 Y3')
 θ : [0.]
index 3 added to ignored list
QSCI energy: -5.251192387396456, (new generator X1 Y3)
iteration: 1
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
 θ : [-0.7853981643835831]
QSCI energy: -3.661812831373912, (new generator X1 Y2)
ignored list emptied: [] -> []
iteration: 2
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
 θ : [-0.8380969751184906]
QSCI energy: -5.251192387396456, (new generator X1 Y3)
ignored list emptied: [] -> []
iteration: 3
selected second largest gradient
index 3 added to ignored list
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
FUSED: ('X1 Y2', 'X1 Y2')
 θ : [0.]
index 2 added to ignored list
QSCI energy: -5.251192387396456, (new generator X1 Y2)
iteration: 4
new generator: ['1.0', 'X0 Y3'], index: 1 out of 5. # precise gradient: 5
 θ : [0.]
index 1 added to ignored list
QSCI energy: -5.251192387396458, (new generator X0 Y3)
iteration: 1
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
 θ : [-0.7853981643835831]
QSCI energy: -3.661812831373912, (new generator X1 Y2)
ignored list emptied: [] -> []
iteration: 2
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
 θ : [-0.8380969751184906]
QSCI energy: -5.251192387396456, (new generator X1 Y3)
ignored list emptied: [] -> []
iteration: 3

new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
FUSED: ('X1 Y2', 'X1 Y2')
 θ : [0.]
index 2 added to ignored list
QSCI energy: -5.251192387396458, (new generator X1 Y2)
iteration: 4
new generator: ['1.0', 'X0 Y1 X2 X3'], index: 4 out of 5. # precise gradient: 5
 θ : [0.]
index 4 added to ignored list
QSCI energy: -5.251192387396458, (new generator X0 Y1 X2 X3)
iteration: 1
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
 θ : [-0.7853981643835831]
QSCI energy: -3.661812831373912, (new generator X1 Y2)
iteration: 2
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
 θ : [-0.8380969751184906]
QSCI energy: -4.1812076013045765, (new generator X1 Y3)
iteration: 3
new generator: ['1.0', 'X0 Y2'], index: 0 out of 5. # precise gradient: 5
 θ : [-0.09167295304496374]
QSCI energy: -4.72877117556295, (new generator X0 Y2)
iteration: 4
new generator: ['1.0', 'X0 X1 Y2 X3'], index: 4 out of 5. # precise gradient: 5
 θ : [0.]
index 4 added to ignored list
QSCI energy: -4.728771175562951, (new generator X0 X1 Y2 X3)
iteration: 5
new generator: ['1.0', 'X1 Y3'], index: 3 out of 5. # precise gradient: 5
FUSED: ('X1 Y3', 'X1 Y3')
 θ : [0.]
index 3 added to ignored list
QSCI energy: -4.728771175562951, (new generator X1 Y3)
iteration: 6
new generator: ['1.0', 'X1 Y2'], index: 2 out of 5. # precise gradient: 5
FUSED: ('X1 Y2', 'X1 Y2')
 θ : [0.]
index 2 added to ignored list
QSCI energy: -4.72877117556295, (new generator X1 Y2)
iteration: 7
new generator: ['1.0', 'X0 Y2'], index: 0 out of 5. # precise gradient: 5
FUSED: ('X0 Y2', 'X0 Y2')
 θ : [0.]
index 0 added to ignored list
QSCI energy: -4.728771175562951, (new generator X0 Y2)
Data written successfully to 04qubits_05.X.data
Data written successfully to 04qubits_05.Y.data

[illegible]

```

x_points = [np.float64(0.0), np.float64(0.03), np.float64(0.06),
np.float64(0.09), np.float64(0.12), np.float64(0.15), np.float64(0.18),
np.float64(0.21), np.float64(0.24), np.float64(0.27)] y_points = [1.          +0.j
0.9999819999819999+0.00395820395820401j
0.9999135999136   +0.00695340695340696j
0.9998703998703999+0.00948780948780947j
0.9996975996975996+0.01342261342261342j
0.9996903996903996+0.01699381699381708j
0.9994419994419994+0.02106542106542109j
0.9992403992403993+0.02465822465822476j
0.9989415989415988+0.02623142623142627j
0.9987039987039987+0.03346743346743342j]
fit1: [ 0.16366444163101695 -0.7405827524176947 ]
[ 0.16366444163101695 -0.7405827524176947  0.16367444153101696
 -0.          ] 6.516129755235547e-11
[ 1.4155015220674988e-01 -6.4214554552052971e-01
 1.4133772962959920e-01
 -2.3988174562220102e-01  1.3753332802560197e-06]
1.1573891021743605e-10
E_gs: -0.6421455455205297
test mps sampling took: (0.0014023780822753906, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.03
1 Execution time: 0:00:02.256662 ovlp:
(0.9999783999784+0.004231804231804137j)
2 Execution time: 0:00:02.258600 ovlp:
(0.9999243999243999+0.008170208170208193j)
3 Execution time: 0:00:02.261167 ovlp:
(0.9998595998595998+0.011525411525411533j)
4 Execution time: 0:00:02.264466 ovlp:
(0.9997011997011997+0.014779814779814826j)
5 Execution time: 0:00:02.268251 ovlp:
(0.9995895995895996+0.018898218898218966j)
6 Execution time: 0:00:02.272828 ovlp:
(0.9994023994023995+0.019978219978219913j)
7 Execution time: 0:00:02.278051 ovlp:
(0.9993231993231992+0.026602226602226553j)
8 Execution time: 0:00:02.283864 ovlp:
(0.9990495990495991+0.025727425727425812j)
9 Execution time: 0:00:02.290428 ovlp:
(0.9985995985995986+0.02960822960822962j)
x_points = [np.float64(0.0), np.float64(0.03), np.float64(0.06),
np.float64(0.09), np.float64(0.12), np.float64(0.15), np.float64(0.18),
np.float64(0.21), np.float64(0.24), np.float64(0.27)] y_points = [1.          +0.j
0.9999783999784   +0.00423180423180414j

```

```

0.9999243999243999+0.00817020817020819j
0.9998595998595998+0.01152541152541153j
0.9997011997011997+0.01477981477981483j
0.9995895995895996+0.01889821889821897j
0.9994023994023995+0.01997821997821991j
0.9993231993231992+0.02660222660222655j
0.9990495990495991+0.02572742572742581j
0.9985995985995986+0.02960822960822962j]
fit1: [ 0.48429868929786873 -0.24215974727701628]
[ 0.48429868929786873 -0.24215974727701628 0.48430868919786874
-0.          ] 3.7519206880925513e-11
[ 4.1787329109451199e-01 -2.0894554623910444e-01
4.1788521208230639e-01
-7.7900834290419121e-02 1.3714341478213230e-06]
8.156354768781284e-11
E_gs: -0.20894554623910444
test mps sampling took: (0.0013153553009033203, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.10378217703217955
1 Execution time: 0:00:02.553001 ovlp:
(0.9997824+0.009660800000000025j)
2 Execution time: 0:00:02.555074 ovlp:
(0.9991904+0.024351999999999993j)
3 Execution time: 0:00:02.557732 ovlp:
(0.9983312+0.035271999999999997j)
4 Execution time: 0:00:02.560941 ovlp: (0.996888+0.04743840000000001j)
x_points = [np.float64(0.0), np.float64(0.10378217703217955),
np.float64(0.2075643540643591), np.float64(0.31134653109653865),
np.float64(0.4151287081287182)] y_points = [1.      +0.j
0.9997824+0.009660800000000025j
0.9991904+0.024351999999999993j 0.9983312+0.035271999999999997j
0.996888 +0.04743840000000001j ]
fit1: [ 0.2824770817559789 -0.42408553695860485]
[ 0.2824770817559789 -0.42408553695860485 0.2824870816559789
-0.          ] 5.4989320550360514e-11
[ 2.4433992610472238e-01 -3.6680742663473820e-01
2.4435107811216999e-01
-1.4211881790585307e-01 1.3502265304627619e-06]
2.554213866737663e-10
E_gs: -0.3668074266347382
test mps sampling took: (0.0013129711151123047, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.19906500065476082

```

```

1 Execution time: 0:00:02.900455  ovlp: (0.99932+0.025976j)
2 Execution time: 0:00:02.902545  ovlp:
(0.9974000000000001+0.04578400000000005j)
3 Execution time: 0:00:02.906134  ovlp:
(0.9939199999999999+0.06955200000000006j)
4 Execution time: 0:00:02.909633  ovlp:
(0.9886079999999999+0.09367199999999998j)
5 Execution time: 0:00:02.914810  ovlp:
(0.982264+0.11440000000000006j)
6 Execution time: 0:00:02.919963  ovlp: (0.97576+0.13346400000000003j)
7 Execution time: 0:00:02.925202  ovlp:
(0.9663679999999999+0.15689599999999992j)
8 Execution time: 0:00:02.931978  ovlp:
(0.9561040000000001+0.17769600000000008j)
9 Execution time: 0:00:02.939766  ovlp: (0.94564+0.19498400000000005j)
10 Execution time: 0:00:02.947838  ovlp:
(0.9328160000000001+0.21898400000000007j)
11 Execution time: 0:00:02.956762  ovlp:
(0.9195519999999999+0.23381600000000002j)
12 Execution time: 0:00:02.966055  ovlp: (0.906488+0.25708j)
13 Execution time: 0:00:02.976798  ovlp:
(0.888584+0.26896800000000001j)
14 Execution time: 0:00:02.987268  ovlp:
(0.8739920000000001+0.28723199999999993j)
15 Execution time: 0:00:02.997911  ovlp:
(0.856544+0.29833599999999993j)
16 Execution time: 0:00:03.010446  ovlp: (0.839008+0.31270400000000001j)
17 Execution time: 0:00:03.022663  ovlp:
(0.8202480000000001+0.32345599999999997j)
18 Execution time: 0:00:03.036541  ovlp: (0.802144+0.33713600000000001j)
19 Execution time: 0:00:03.051906  ovlp: (0.781272+0.348344j)
20 Execution time: 0:00:03.068310  ovlp:
(0.7603599999999999+0.35454399999999997j)
x_points = [np.float64(0.0), np.float64(0.19906500065476082),
np.float64(0.39813000130952164), np.float64(0.5971950019642824),
np.float64(0.7962600026190433), np.float64(0.9953250032738041),
np.float64(1.1943900039285649), np.float64(1.3934550045833258),
np.float64(1.5925200052380866), np.float64(1.7915850058928473),
np.float64(1.9906500065476083), np.float64(2.189715007202369),
np.float64(2.3887800078571297), np.float64(2.5878450085118905),
np.float64(2.7869100091666517), np.float64(2.9859750098214124),
np.float64(3.185040010476173), np.float64(3.384105011130934),
np.float64(3.5831700117856946), np.float64(3.782235012440456),
np.float64(3.9813000130952165)] y_points = [1.          +0.j
0.99932          +0.025976j
0.9974000000000001+0.04578400000000005j
0.9939199999999999+0.06955200000000006j

```

```

0.9886079999999999+0.09367199999999998j
0.982264      +0.11440000000000006j
0.97576      +0.13346400000000003j
0.9663679999999999+0.15689599999999992j
0.9561040000000001+0.17769600000000008j
0.94564      +0.19498400000000005j
0.9328160000000001+0.21898400000000007j
0.9195519999999999+0.23381600000000002j
0.906488      +0.25708j
0.888584      +0.26896800000000001j
0.8739920000000001+0.28723199999999993j
0.856544      +0.29833599999999993j
0.839008      +0.31270400000000001j
0.8202480000000001+0.32345599999999997j
0.802144      +0.33713600000000001j
0.781272      +0.348344j
0.7603599999999999+0.35454399999999997j]
fit1: [ 0.38584829657304054 -0.29826831725542746]
[ 0.38584829657304054 -0.29826831725542746 0.38585829647304054
-0.      ] 6.517912442985564e-10
[ 2.9278691076875679e-01 -3.4001610784257291e-01
2.8706518993635255e-01
-6.0370177819435891e-02 7.8247750580978289e-06]
2.880447279282159e-10
E_gs: -0.3400161078425729
test mps sampling took: (0.0014252662658691406, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.23193422579329537
1 Execution time: 0:00:03.485217 ovlp:
(0.9990000000000001+0.02446400000000004j)
2 Execution time: 0:00:03.487897 ovlp:
(0.996192+0.055088000000000026j)
3 Execution time: 0:00:03.490835 ovlp:
(0.991328+0.07733600000000007j)
4 Execution time: 0:00:03.494810 ovlp:
(0.9849680000000001+0.10623999999999989j)
5 Execution time: 0:00:03.499383 ovlp: (0.976504+0.131008j)
6 Execution time: 0:00:03.504550 ovlp: (0.966288+0.15796800000000001j)
7 Execution time: 0:00:03.510765 ovlp: (0.955176+0.18281600000000001j)
8 Execution time: 0:00:03.517622 ovlp:
(0.940976+0.20557599999999998j)
9 Execution time: 0:00:03.525015 ovlp: (0.9268559999999999+0.222024j)
10 Execution time: 0:00:03.532486 ovlp:
(0.910248+0.24477600000000001j)
11 Execution time: 0:00:03.540599 ovlp:

```



```

(0.892576+0.26585600000000001j)
12 Execution time: 0:00:03.549448  ovlp: (0.872984+0.282848j)
13 Execution time: 0:00:03.558820  ovlp: (0.852408+0.299304j)
14 Execution time: 0:00:03.568746  ovlp:
(0.83288000000000001+0.31558400000000001j)
15 Execution time: 0:00:03.579394  ovlp:
(0.81333600000000001+0.3285199999999999j)
16 Execution time: 0:00:03.590786  ovlp: (0.788416+0.343048j)
17 Execution time: 0:00:03.602651  ovlp:
(0.7647839999999999+0.35112800000000001j)
18 Execution time: 0:00:03.616877  ovlp:
(0.74120000000000001+0.3606799999999999j)
19 Execution time: 0:00:03.630240  ovlp: (0.71784+0.36524j)
20 Execution time: 0:00:03.644628  ovlp:
(0.6957599999999999+0.37615200000000004j)
x_points = [np.float64(0.0), np.float64(0.23193422579329537),
np.float64(0.46386845158659074), np.float64(0.6958026773798861),
np.float64(0.9277369031731815), np.float64(1.159671128966477),
np.float64(1.3916053547597722), np.float64(1.6235395805530675),
np.float64(1.855473806346363), np.float64(2.0874080321396584),
np.float64(2.319342257932954), np.float64(2.551276483726249),
np.float64(2.7832107095195444), np.float64(3.01514493531284),
np.float64(3.247079161106135), np.float64(3.4790133868994304),
np.float64(3.710947612692726), np.float64(3.9428818384860214),
np.float64(4.174816064279317), np.float64(4.406750290072612),
np.float64(4.638684515865908)] y_points = [1.          +0.j
0.99900000000000001+0.024464000000000004j
0.996192          +0.055088000000000003j
0.991328          +0.077336000000000007j
0.98496800000000001+0.10623999999999999j
0.976504          +0.131008j
0.966288          +0.15796800000000001j
0.955176          +0.18281600000000001j
0.940976          +0.20557599999999999j
0.9268559999999999+0.222024j
0.910248          +0.24477600000000001j
0.892576          +0.26585600000000001j
0.872984          +0.282848j
0.852408          +0.299304j
0.83288000000000001+0.31558400000000001j
0.81333600000000001+0.3285199999999999j
0.788416          +0.343048j
0.7647839999999999+0.35112800000000001j
0.74120000000000001+0.3606799999999999j
0.71784          +0.36524j
0.6957599999999999+0.37615200000000004j]
fit1: [ 0.38292280850017096 -0.2972157128290874 ]

```

```
[ 0.32804523963369037 -0.3227039895735241 0.38293280840498123
-0.02580462895081389] 4.5520537338223784e-10
[ 0.31178293845203175 -0.32891740052679824 0.289732984551749
-0.05170264828982007 0.00410455572723318] 4.2863848464389947e-10
E_gs: -0.32891740052679824
test mps sampling took: (0.0014071464538574219, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2324626022628131
1 Execution time: 0:00:04.030226 ovlp:
(0.9989979989979989+0.028401028401028316j)
2 Execution time: 0:00:04.032354 ovlp:
(0.9964119964119964+0.0536970536970538j)
3 Execution time: 0:00:04.035335 ovlp:
(0.9910959910959911+0.07672507672507667j)
4 Execution time: 0:00:04.039104 ovlp:
(0.984879984879985+0.1069051069051068j)
5 Execution time: 0:00:04.043887 ovlp:
(0.9768039768039769+0.13403713403713402j)
6 Execution time: 0:00:04.049074 ovlp:
(0.9658299658299658+0.1576411576411576j)
7 Execution time: 0:00:04.054205 ovlp:
(0.9547539547539547+0.18081318081318076j)
8 Execution time: 0:00:04.061443 ovlp:
(0.9404379404379404+0.206961206961207j)
9 Execution time: 0:00:04.069352 ovlp:
(0.9255999255999257+0.2260712260712261j)
10 Execution time: 0:00:04.078583 ovlp:
(0.9092499092499093+0.24667524667524665j)
11 Execution time: 0:00:04.088712 ovlp:
(0.8939318939318939+0.2673272673272673j)
12 Execution time: 0:00:04.099816 ovlp:
(0.8749298749298748+0.28433728433728445j)
13 Execution time: 0:00:04.110168 ovlp:
(0.8544098544098544+0.303069303069303j)
14 Execution time: 0:00:04.121642 ovlp:
(0.8310878310878311+0.3166053166053166j)
15 Execution time: 0:00:04.133988 ovlp:
(0.8102438102438103+0.3299793299793299j)
x_points = [np.float64(0.0), np.float64(0.2324626022628131),
np.float64(0.4649252045256262), np.float64(0.6973878067884393),
np.float64(0.9298504090512524), np.float64(1.1623130113140654),
np.float64(1.3947756135768785), np.float64(1.6272382158396916),
np.float64(1.8597008181025048), np.float64(2.092163420365318),
np.float64(2.324626022628131), np.float64(2.557088624890944),
np.float64(2.789551227153757), np.float64(3.0220138294165704),
```

```

np.float64(3.2544764316793833), np.float64(3.4869390339421966)]
y_points = [1.          +0.j
0.9989979989979989+0.02840102840102832j
0.9964119964119964+0.0536970536970538j
0.9910959910959911+0.07672507672507667j
0.984879984879985 +0.1069051069051068j
0.9768039768039769+0.13403713403713402j
0.9658299658299658+0.1576411576411576j
0.9547539547539547+0.18081318081318076j
0.9404379404379404+0.206961206961207j
0.9255999255999257+0.2260712260712261j
0.9092499092499093+0.24667524667524665j
0.8939318939318939+0.2673272673272673j
0.8749298749298748+0.28433728433728445j
0.8544098544098544+0.303069303069303j
0.8310878310878311+0.3166053166053166j
0.8102438102438103+0.3299793299793299j ]
fit1: [ 0.3844107975685197 -0.2997639704203549]
[ 0.3844107975685197 -0.2997639704203549  0.3844207974685197
 -0.          ] 2.655924766462151e-10
[ 2.8818483784374505e-01 -3.4154688943448219e-01
 2.5226674877081773e-01
 -7.2200251817228195e-02  3.0450529688776862e-06]
1.6252308662496386e-10
E_gs: -0.3415468894344822
test mps sampling took: (0.0013275146484375, Counter({2: 5, 0: 5}))
truncated ham size: 12  Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.06299872873025138
1  Execution time: 0:00:04.543361  ovlp:
(0.999933999934+0.00815700815700815j)
2  Execution time: 0:00:04.545465  ovlp:
(0.9997119997119996+0.015771015771015806j)
3  Execution time: 0:00:04.547977  ovlp:
(0.9994299994299993+0.020373020373020356j)
4  Execution time: 0:00:04.551276  ovlp:
(0.998913998913999+0.030339030339030293j)
5  Execution time: 0:00:04.555076  ovlp:
(0.9984039984039983+0.03722703722703713j)
6  Execution time: 0:00:04.559547  ovlp:
(0.9973779973779975+0.04361104361104351j)
7  Execution time: 0:00:04.564721  ovlp:
(0.9965979965979965+0.0520050520050519j)
8  Execution time: 0:00:04.570526  ovlp:
(0.9955539955539956+0.058437058437058376j)
9  Execution time: 0:00:04.577081  ovlp:

```

```

(0.9943839943839943+0.06497106497106486j)
10 Execution time: 0:00:04.584280  ovlp:
(0.9928719928719929+0.07311907311907317j)
11 Execution time: 0:00:04.592084  ovlp:
(0.9911739911739912+0.07905907905907905j)
12 Execution time: 0:00:04.600462  ovlp:
(0.9901599901599902+0.0865890865890866j)
13 Execution time: 0:00:04.609533  ovlp:
(0.988041988041988+0.09606309606309615j)
14 Execution time: 0:00:04.619202  ovlp:
(0.9864219864219865+0.09977109977109988j)
15 Execution time: 0:00:04.629566  ovlp:
(0.9838839838839839+0.1077451077451077j)
x_points = [np.float64(0.0), np.float64(0.06299872873025138),
np.float64(0.12599745746050275), np.float64(0.18899618619075415),
np.float64(0.2519949149210055), np.float64(0.31499364365125687),
np.float64(0.3779923723815083), np.float64(0.44099110111175965),
np.float64(0.503989829842011), np.float64(0.5669885585722624),
np.float64(0.6299872873025137), np.float64(0.6929860160327651),
np.float64(0.7559847447630166), np.float64(0.8189834734932679),
np.float64(0.881982202235193), np.float64(0.9449809309537707)]
y_points = [1.          +0.j
0.999933999934   +0.00815700815700815j
0.9997119997119996+0.01577101577101581j
0.9994299994299993+0.02037302037302036j
0.998913998913999 +0.03033903033903029j
0.9984039984039983+0.03722703722703713j
0.9973779973779975+0.04361104361104351j
0.9965979965979965+0.0520050520050519j
0.9955539955539956+0.05843705843705838j
0.9943839943839943+0.06497106497106486j
0.9928719928719929+0.07311907311907317j
0.9911739911739912+0.07905907905907905j
0.9901599901599902+0.0865890865890866j
0.988041988041988 +0.09606309606309615j
0.9864219864219865+0.09977109977109988j
0.9838839838839839+0.1077451077451077j ]
fit1: [ 0.438420399377423  -0.26503244741738613]
[ 0.438420399377423  -0.26503244741738613  0.438430399277423
 -0.          ] 6.823664281075955e-11
[ 3.3628778771227813e-01 -2.9886298699208874e-01
 3.3545940122121598e-01
 -4.7882077095285615e-02  3.7658797932689483e-06]
7.670302140715088e-11
E_gs: -0.29886298699208874
test mps sampling took: (0.0012662410736083984, Counter({2: 5, 0: 5}))
truncated ham size: 12  Number of fitting points: 15

```

shots per matrix element: 357142.0

Total gate count: 224 2 qubit gates: 120

N gate: 224 dt: 0.05090339580301356

1 Execution time: 0:00:05.246860 ovlp:
(0.9999663999193598+0.009424822619574336j)

2 Execution time: 0:00:05.248830 ovlp:
(0.999831999596799+0.01212962911110993j)

3 Execution time: 0:00:05.251510 ovlp:
(0.9995911990188777+0.018127243505384305j)

4 Execution time: 0:00:05.254831 ovlp:
(0.9992551982124758+0.027288865493277248j)

5 Execution time: 0:00:05.258605 ovlp:
(0.9988799973119935+0.03147207553298137j)

6 Execution time: 0:00:05.263041 ovlp:
(0.9984879963711912+0.037318489564375j)

7 Execution time: 0:00:05.268270 ovlp:
(0.997759994623987+0.03868489284374288j)

8 Execution time: 0:00:05.274020 ovlp:
(0.9970935930246232+0.0494313186351647j)

9 Execution time: 0:00:05.280733 ovlp:
(0.9962647910354985+0.05738893773345066j)

10 Execution time: 0:00:05.288017 ovlp:
(0.9953407888178931+0.056588135811525886j)

11 Execution time: 0:00:05.295927 ovlp:
(0.994282386277727+0.06468015523237258j)

12 Execution time: 0:00:05.304391 ovlp:
(0.9938511852428447+0.06992736782568287j)

13 Execution time: 0:00:05.315238 ovlp:
(0.9923335816005958+0.07753218607724666j)

14 Execution time: 0:00:05.325784 ovlp:
(0.990989578374988+0.08575860582065387j)

x_points = [np.float64(0.0), np.float64(0.05090339580301356),
np.float64(0.10180679160602712), np.float64(0.1527101874090407),
np.float64(0.20361358321205425), np.float64(0.2545169790150678),
np.float64(0.3054203748180814), np.float64(0.35632377062109494),
np.float64(0.4072271664241085), np.float64(0.45813056222712206),
np.float64(0.5090339580301356), np.float64(0.5599373538331491),
np.float64(0.6108407496361627), np.float64(0.6617441454391764),
np.float64(0.7126475412421899)] y_points = [1. +0.j

0.9999663999193598+0.00942482261957434j

0.999831999596799 +0.01212962911110993j

0.9995911990188777+0.01812724350538431j

0.9992551982124758+0.02728886549327725j

0.9988799973119935+0.03147207553298137j

0.9984879963711912+0.037318489564375j

0.997759994623987 +0.03868489284374288j

0.9970935930246232+0.0494313186351647j

```
0.9962647910354985+0.05738893773345066j
0.9953407888178931+0.05658813581152589j
0.994282386277727 +0.06468015523237258j
0.9938511852428447+0.06992736782568287j
0.9923335816005958+0.07753218607724666j
0.990989578374988 +0.08575860582065387j]
fit1: [ 0.37517486088827456 -0.3154687547015748 ]
[ 0.37517486088827456 -0.3154687547015748  0.37518486078827457
-0.          ] 3.4402326777401505e-10
[ 2.587820266201098e-01 -3.449265931986988e-01
3.040101522229608e-01
-9.401881382242931e-02  3.859095283406140e-06]
3.4759003396547327e-10
E_gs: -0.3449265931986988
test mps sampling took: (0.0012907981872558594, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.11228644198232662
1 Execution time: 0:00:05.851218 ovlp:
(0.9997799997799999+0.012828212828212893j)
2 Execution time: 0:00:05.853116 ovlp:
(0.9990363990363991+0.026851026851026916j)
3 Execution time: 0:00:05.855710 ovlp:
(0.9979891979891979+0.037433037433037386j)
4 Execution time: 0:00:05.859098 ovlp:
(0.9963391963391963+0.052859452859452816j)
5 Execution time: 0:00:05.862930 ovlp:
(0.9944515944515944+0.06593626593626589j)
6 Execution time: 0:00:05.867507 ovlp:
(0.9919611919611919+0.08074668074668079j)
7 Execution time: 0:00:05.872804 ovlp:
(0.9891055891055891+0.0893926893926893j)
8 Execution time: 0:00:05.878715 ovlp:
(0.9854095854095855+0.10658790658790651j)
9 Execution time: 0:00:05.885312 ovlp:
(0.9821007821007821+0.11600391600391591j)
10 Execution time: 0:00:05.892472 ovlp:
(0.9777799777799778+0.12885632885632892j)
11 Execution time: 0:00:05.900340 ovlp:
(0.9728079728079728+0.140907940907941j)
x_points = [np.float64(0.0), np.float64(0.11228644198232662),
np.float64(0.22457288396465325), np.float64(0.33685932594697987),
np.float64(0.4491457679293065), np.float64(0.5614322099116331),
np.float64(0.6737186518939597), np.float64(0.7860050938762864),
np.float64(0.898291535858613), np.float64(1.0105779778409396),
np.float64(1.1228644198232662), np.float64(1.2351508618055929)] y_points
```

```

= [1.          +0.j
 0.9997799997799999+0.01282821282821289j
 0.9990363990363991+0.02685102685102692j
 0.9979891979891979+0.03743303743303739j
 0.9963391963391963+0.05285945285945282j
 0.9944515944515944+0.06593626593626589j
 0.9919611919611919+0.08074668074668079j
 0.9891055891055891+0.0893926893926893j
 0.9854095854095855+0.10658790658790651j
 0.9821007821007821+0.11600391600391591j
 0.9777799777799778+0.12885632885632892j
 0.9728079728079728+0.140907940907941j ]
fit1: [ 0.3627016565363186 -0.32502958823274913]
[ 0.3627016565363186 -0.32502958823274913 0.3627116564363186
 -0.          ] 6.839443263803492e-11
[ 2.8866940615773862e-01 -3.3373278077539908e-01
 2.8909517942321905e-01
 -7.4129807803823750e-02 2.6802180868950868e-06]
6.510939921986922e-11
E_gs: -0.3337327807753991
test mps sampling took: (0.0012934207916259766, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.07383385166819134
1 Execution time: 0:00:06.368801 ovlp:
(0.9999467998191194+0.008333428333656245j)
2 Execution time: 0:00:06.370709 ovlp:
(0.9996199987079957+0.016913857507115493j)
3 Execution time: 0:00:06.373291 ovlp:
(0.9990651968216693+0.025798287714178247j)
4 Execution time: 0:00:06.376633 ovlp:
(0.9984723948061422+0.0369779257249474j)
5 Execution time: 0:00:06.380545 ovlp:
(0.9975983918345321+0.04401554965286891j)
6 Execution time: 0:00:06.385202 ovlp:
(0.9964279878551587+0.05209437712088216j)
7 Execution time: 0:00:06.390467 ovlp:
(0.9953335841341862+0.0606596062426612j)
8 Execution time: 0:00:06.396318 ovlp:
(0.993775578836968+0.06847243280627158j)
9 Execution time: 0:00:06.404008 ovlp:
(0.9924075741857523+0.07414205208297697j)
10 Execution time: 0:00:06.412302 ovlp:
(0.9904163674156492+0.08481248836246036j)
11 Execution time: 0:00:06.420260 ovlp:
(0.9882807601545844+0.09336251743255919j)

```

```

12 Execution time: 0:00:06.428888  ovlp:
(0.9860767526609591+0.10026334089535904j)
13 Execution time: 0:00:06.438277  ovlp:
(0.9836295443404508+0.10996097386731107j)
14 Execution time: 0:00:06.449740  ovlp:
(0.9809011350638592+0.11750779952651835j)
15 Execution time: 0:00:06.460699  ovlp:
(0.9782943262007091+0.12440862298931821j)
16 Execution time: 0:00:06.473306  ovlp:
(0.9754975166915567+0.13355905410078384j)
17 Execution time: 0:00:06.485291  ovlp:
(0.9720775050635173+0.14176708200807875j)
18 Execution time: 0:00:06.497927  ovlp:
(0.9691590951409235+0.14829550420471427j)
19 Execution time: 0:00:06.512946  ovlp:
(0.965480682634321+0.1587987399157158j)
x_points = [np.float64(0.0), np.float64(0.07383385166819134),
np.float64(0.14766770333638268), np.float64(0.22150155500457402),
np.float64(0.29533540667276537), np.float64(0.3691692583409567),
np.float64(0.44300311000914805), np.float64(0.5168369616773394),
np.float64(0.5906708133455307), np.float64(0.6645046650137221),
np.float64(0.7383385166819134), np.float64(0.8121723683501048),
np.float64(0.8860062200182961), np.float64(0.9598400716864874),
np.float64(1.0336739233546788), np.float64(1.1075077750228701),
np.float64(1.1813416266910615), np.float64(1.2551754783592528),
np.float64(1.3290093300274441), np.float64(1.4028431816956355)] y_points
= [1.          +0.j
0.9999467998191194+0.00833342833365625j
0.9996199987079957+0.01691385750711549j
0.9990651968216693+0.02579828771417825j
0.9984723948061422+0.0369779257249474j
0.9975983918345321+0.04401554965286891j
0.9964279878551587+0.05209437712088216j
0.9953335841341862+0.0606596062426612j
0.993775578836968 +0.06847243280627158j
0.9924075741857523+0.07414205208297697j
0.9904163674156492+0.08481248836246036j
0.9882807601545844+0.09336251743255919j
0.9860767526609591+0.10026334089535904j
0.9836295443404508+0.10996097386731107j
0.9809011350638592+0.11750779952651835j
0.9782943262007091+0.12440862298931821j
0.9754975166915567+0.13355905410078384j
0.9720775050635173+0.14176708200807875j
0.9691590951409235+0.14829550420471427j
0.965480682634321 +0.1587987399157158j ]
fit1: [ 0.3588507570464917 -0.3222335531076795]

```


[0.3588507570464917 -0.3222335531076795 0.3588607569464917
 -0.] 8.043234457029702e-11
 [2.7568633043500101e-01 -3.4803810361550441e-01
 2.7658220433122016e-01
 -7.1953267774082744e-02 3.2854934267527825e-06]
 5.772131469171819e-11
 E_gs: -0.3480381036155044
 test mps sampling took: (0.0012826919555664062, Counter({0: 6, 2: 4}))
 truncated ham size: 12 Number of fitting points: 24
 shots per matrix element: 217391.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.10321604246984181
 1 Execution time: 0:00:07.015626 ovlp:
 (0.9998619998067997+0.013059418283185575j)
 2 Execution time: 0:00:07.017610 ovlp:
 (0.9992915990082387+0.02236063130488386j)
 3 Execution time: 0:00:07.020139 ovlp:
 (0.9981875974626364+0.03790865307211422j)
 4 Execution time: 0:00:07.023255 ovlp:
 (0.9967339954275936+0.04788146703405394j)
 5 Execution time: 0:00:07.027036 ovlp:
 (0.9948019927227898+0.05881108233551524j)
 6 Execution time: 0:00:07.031549 ovlp:
 (0.9935323909453473+0.07060549884769829j)
 7 Execution time: 0:00:07.036656 ovlp:
 (0.9909471873260622+0.08341191677668358j)
 8 Execution time: 0:00:07.042386 ovlp:
 (0.9883803837325371+0.09589633425486799j)
 9 Execution time: 0:00:07.048858 ovlp:
 (0.9855743798041317+0.10813235138529187j)
 10 Execution time: 0:00:07.055902 ovlp:
 (0.9811859736603632+0.11916316682843364j)
 11 Execution time: 0:00:07.063861 ovlp:
 (0.9772299681219554+0.1312703837785374j)
 12 Execution time: 0:00:07.072287 ovlp:
 (0.97446996425795+0.14066359692903574j)
 13 Execution time: 0:00:07.081374 ovlp:
 (0.9681955554737776+0.15164841230777726j)
 14 Execution time: 0:00:07.091096 ovlp:
 (0.963724349214089+0.16537483152476407j)
 15 Execution time: 0:00:07.101584 ovlp:
 (0.9584251417951986+0.17453804435326203j)
 16 Execution time: 0:00:07.112820 ovlp:
 (0.9533283346596686+0.1853480594872834j)
 17 Execution time: 0:00:07.126358 ovlp:
 (0.946897525656536+0.19323247052545867j)
 18 Execution time: 0:00:07.138907 ovlp:

```

(0.9427667198734078+0.20682088954924538j)
19 Execution time: 0:00:07.152171 ovlp:
(0.9351307091829928+0.2156069018496627j)
20 Execution time: 0:00:07.166109 ovlp:
(0.9282950996131394+0.2248161147425607j)
21 Execution time: 0:00:07.180682 ovlp:
(0.9208430891803248+0.23070412298577225j)
22 Execution time: 0:00:07.195806 ovlp:
(0.9137038791854308+0.24325294055411684j)
23 Execution time: 0:00:07.211618 ovlp:
(0.9040254656356519+0.2533453546834965j)
x_points = [np.float64(0.0), np.float64(0.10321604246984181),
np.float64(0.20643208493968362), np.float64(0.3096481274095254),
np.float64(0.41286416987936725), np.float64(0.5160802123492091),
np.float64(0.6192962548190508), np.float64(0.7225122972888927),
np.float64(0.8257283397587345), np.float64(0.9289443822285763),
np.float64(1.0321604246984182), np.float64(1.13537646716826),
np.float64(1.2385925096381016), np.float64(1.3418085521079435),
np.float64(1.4450245945777853), np.float64(1.5482406370476272),
np.float64(1.651456679517469), np.float64(1.7546727219873108),
np.float64(1.8578887644571527), np.float64(1.9611048069269945),
np.float64(2.0643208493968364), np.float64(2.167536891866678),
np.float64(2.27075293433652), np.float64(2.3739689768063617)] y_points =
[1.          +0.j
0.9998619998067997+0.01305941828318558j
0.9992915990082387+0.02236063130488386j
0.9981875974626364+0.03790865307211422j
0.9967339954275936+0.04788146703405394j
0.9948019927227898+0.05881108233551524j
0.9935323909453473+0.07060549884769829j
0.9909471873260622+0.08341191677668358j
0.9883803837325371+0.09589633425486799j
0.9855743798041317+0.10813235138529187j
0.9811859736603632+0.11916316682843364j
0.9772299681219554+0.1312703837785374j
0.97446996425795 +0.14066359692903574j
0.9681955554737776+0.15164841230777726j
0.963724349214089 +0.16537483152476407j
0.9584251417951986+0.17453804435326203j
0.9533283346596686+0.1853480594872834j
0.946897525656536 +0.19323247052545867j
0.9427667198734078+0.20682088954924538j
0.9351307091829928+0.2156069018496627j
0.9282950996131394+0.2248161147425607j
0.9208430891803248+0.23070412298577225j
0.9137038791854308+0.24325294055411684j
0.9040254656356519+0.2533453546834965j ]

```

fit1: [0.3840875866996081 -0.3024694806079323]
[0.3840875866996081 -0.3024694806079323 0.3840975865996081
-0.] 1.7128583378254044e-10
[2.5879726795427976e-01 -3.6194253089604245e-01
2.9469978847738931e-01
-7.9797817800090695e-02 4.1836968079594234e-06]
1.3967148696479484e-10
E_gs: -0.36194253089604245
test mps sampling took: (0.0013489723205566406, Counter({2: 8, 0: 2}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.18246158897573048
1 Execution time: 0:00:07.623796 ovlp:
(0.9994679981911938+0.021215472132605218j)
2 Execution time: 0:00:07.626055 ovlp:
(0.9977807924546944+0.04346834779238251j)
3 Execution time: 0:00:07.628630 ovlp:
(0.9943455807749746+0.06786443073906456j)
4 Execution time: 0:00:07.631870 ovlp:
(0.99048476764821+0.08283648164403767j)
5 Execution time: 0:00:07.635729 ovlp:
(0.9849671488883063+0.10477775624437125j)
6 Execution time: 0:00:07.640106 ovlp:
(0.9785071269242316+0.1195674065291823j)
7 Execution time: 0:00:07.645348 ovlp:
(0.9715987034355917+0.14318068681433527j)
8 Execution time: 0:00:07.651292 ovlp:
(0.9628358736419704+0.16347275580736964j)
9 Execution time: 0:00:07.657839 ovlp:
(0.9523250379051289+0.18252602058847j)
10 Execution time: 0:00:07.664986 ovlp:
(0.9419662026850892+0.20117648400004562j)
11 Execution time: 0:00:07.673917 ovlp:
(0.9320557689896145+0.21556333291533192j)
12 Execution time: 0:00:07.683515 ovlp:
(0.9198349274387534+0.23732980692134342j)
13 Execution time: 0:00:07.692707 ovlp:
(0.905881279996352+0.2513974547513462j)
14 Execution time: 0:00:07.704055 ovlp:
(0.8916616316495476+0.26586790395087334j)
15 Execution time: 0:00:07.714988 ovlp:
(0.8774571833544234+0.27998115193591655j)
16 Execution time: 0:00:07.726245 ovlp:
(0.860030324103102+0.2967620089908305j)
17 Execution time: 0:00:07.737942 ovlp:
(0.8451798736115703+0.30530443803508933j)

```

18 Execution time: 0:00:07.752175 ovlp:
(0.8287562177711405+0.31893128436636675j)
19 Execution time: 0:00:07.765541 ovlp:
(0.8123857621115911+0.3292065193021656j)
x_points = [np.float64(0.0), np.float64(0.18246158897573048),
np.float64(0.36492317795146095), np.float64(0.5473847669271914),
np.float64(0.7298463559029219), np.float64(0.9123079448786524),
np.float64(1.0947695338543828), np.float64(1.2772311228301134),
np.float64(1.4596927118058438), np.float64(1.6421543007815742),
np.float64(1.8246158897573048), np.float64(2.007077478733035),
np.float64(2.1895390677087656), np.float64(2.372000656684496),
np.float64(2.554462245660227), np.float64(2.7369238346359572),
np.float64(2.9193854236116876), np.float64(3.101847012587418),
np.float64(3.2843086015631484), np.float64(3.4667701905388792)]
y_points = [1.          +0.j
0.9994679981911938+0.02121547213260522j
0.9977807924546944+0.04346834779238251j
0.9943455807749746+0.06786443073906456j
0.99048476764821  +0.08283648164403767j
0.9849671488883063+0.10477775624437125j
0.9785071269242316+0.1195674065291823j
0.9715987034355917+0.14318068681433527j
0.9628358736419704+0.16347275580736964j
0.9523250379051289+0.18252602058847j
0.9419662026850892+0.20117648400004562j
0.9320557689896145+0.21556333291533192j
0.9198349274387534+0.23732980692134342j
0.905881279996352  +0.2513974547513462j
0.8916616316495476+0.26586790395087334j
0.8774571833544234+0.27998115193591655j
0.860030324103102  +0.2967620089908305j
0.8451798736115703+0.30530443803508933j
0.8287562177711405+0.31893128436636675j
0.8123857621115911+0.3292065193021656j ]
fit1: [ 0.3823036200785965 -0.30133931988409063]
[ 0.3823036200785965 -0.30133931988409063 0.3823136199785965
-0.          ] 6.731868979226477e-10
[ 2.5598917476187077e-01 -3.6068719323336423e-01
3.0161486788156944e-01
-8.1566859993460028e-02 7.9612967073678956e-06]
9.437340845068359e-10
E_gs: -0.36068719323336423
test mps sampling took: (0.0013399124145507812, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.24437888027366106

```

```

1 Execution time: 0:00:08.187542  ovlp:
(0.9988715988715988+0.02764582764582757j)
2 Execution time: 0:00:08.189408  ovlp:
(0.9957355957355958+0.05666225666225677j)
3 Execution time: 0:00:08.191913  ovlp:
(0.9906003906003906+0.0847630847630847j)
4 Execution time: 0:00:08.195028  ovlp:
(0.9831271831271831+0.11141071141071146j)
5 Execution time: 0:00:08.198776  ovlp:
(0.9736491736491737+0.1367955367955367j)
6 Execution time: 0:00:08.203854  ovlp:
(0.9628103628103628+0.1658035658035657j)
7 Execution time: 0:00:08.209790  ovlp:
(0.9495439495439495+0.1903511903511903j)
x_points = [np.float64(0.0), np.float64(0.24437888027366106),
np.float64(0.4887577605473221), np.float64(0.7331366408209832),
np.float64(0.9775155210946442), np.float64(1.2218944013683053),
np.float64(1.4662732816419664), np.float64(1.7106521619156274)] y_points
= [1.          +0.j
0.9988715988715988+0.02764582764582757j
0.9957355957355958+0.05666225666225677j
0.9906003906003906+0.0847630847630847j
0.9831271831271831+0.11141071141071146j
0.9736491736491737+0.1367955367955367j
0.9628103628103628+0.1658035658035657j
0.9495439495439495+0.1903511903511903j ]
fit1: [ 0.38823737446750956 -0.2980567177899566 ]
[ 0.38823737446750956 -0.2980567177899566  0.38824737436750956
-0.          ] 1.0154935148409328e-11
[ 2.8362058821361741e-01 -3.5005633699388095e-01
2.9972513164587133e-01
-5.7341483127438093e-02  9.1923212552607131e-06]
8.961551852106326e-12
E_gs: -0.35005633699388095
test mps sampling took: (0.0013246536254882812, Counter({0: 6, 2: 4}))
truncated ham size: 12  Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.2927435729149845
1 Execution time: 0:00:08.753260  ovlp:
(0.998396797434876+0.03370565392904634j)
2 Execution time: 0:00:08.755119  ovlp:
(0.9938031900851041+0.06634570615312985j)
3 Execution time: 0:00:08.757737  ovlp:
(0.9865551784882856+0.10211536338458149j)
4 Execution time: 0:00:08.760892  ovlp:
(0.9762159619455391+0.1341746146793834j)

```

```

5 Execution time: 0:00:08.764682 ovlp:
(0.9629871407794253+0.16654586647338632j)
6 Execution time: 0:00:08.769230 ovlp:
(0.9470175152280245+0.1956531130449808j)
7 Execution time: 0:00:08.775182 ovlp:
(0.9292958868734189+0.22218755550008873j)
8 Execution time: 0:00:08.781908 ovlp:
(0.9083966534346455+0.24722919556671297j)
9 Execution time: 0:00:08.789178 ovlp:
(0.885135816217306+0.27220363552581683j)
10 Execution time: 0:00:08.796481 ovlp:
(0.8610877777404444+0.2958100732961173j)
11 Execution time: 0:00:08.804404 ovlp:
(0.8349181358690174+0.3137237019579231j)
12 Execution time: 0:00:08.812982 ovlp:
(0.805801289282063+0.3305333288533261j)
x_points = [np.float64(0.0), np.float64(0.2927435729149845),
np.float64(0.585487145829969), np.float64(0.8782307187449534),
np.float64(1.170974291659938), np.float64(1.4637178645749225),
np.float64(1.7564614374899068), np.float64(2.0492050104048913),
np.float64(2.341948583319876), np.float64(2.6346921562348604),
np.float64(2.927435729149845), np.float64(3.2201793020648295),
np.float64(3.5129228749798136)] y_points = [1.          +0.j
0.998396797434876 +0.03370565392904634j
0.9938031900851041+0.06634570615312985j
0.9865551784882856+0.10211536338458149j
0.9762159619455391+0.1341746146793834j
0.9629871407794253+0.16654586647338632j
0.9470175152280245+0.1956531130449808j
0.9292958868734189+0.22218755550008873j
0.9083966534346455+0.24722919556671297j
0.885135816217306 +0.27220363552581683j
0.8610877777404444+0.2958100732961173j
0.8349181358690174+0.3137237019579231j
0.805801289282063 +0.3305333288533261j ]
fit1: [ 0.38152265468087665 -0.3021054750082356 ]
[ 0.38152265468087665 -0.3021054750082356  0.38153265458087665
-0.          ] 1.4684949879545286e-10
[ 2.5286199493951472e-01 -3.6335547125142292e-01
2.8572510682090674e-01
-8.8430135335992005e-02  3.3269160352016621e-06]
2.2446454762455483e-11
E_gs: -0.3633554712514229
test mps sampling took: (0.0012819766998291016, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 224 2 qubit gates: 120

```

```

N gate: 224 dt: 0.01627884594482672
1 Execution time: 0:00:09.206957 ovlp: (1+0.0026040062496150984j)
2 Execution time: 0:00:09.208804 ovlp: (1+0.003819209166102011j)
3 Execution time: 0:00:09.211240 ovlp:
(0.9999663999193598+0.004306410335384703j)
4 Execution time: 0:00:09.214811 ovlp:
(0.9999215998118396+0.007588018211243774j)
5 Execution time: 0:00:09.218908 ovlp:
(0.9998655996774393+0.00911682188037255j)
6 Execution time: 0:00:09.223907 ovlp:
(0.999848799637119+0.010214424514618736j)
7 Execution time: 0:00:09.229810 ovlp:
(0.9997591994220787+0.012028828869189212j)
8 Execution time: 0:00:09.235734 ovlp:
(0.999663999193598+0.015428037027288788j)
9 Execution time: 0:00:09.242256 ovlp:
(0.9995855990054376+0.017354441650659913j)
10 Execution time: 0:00:09.249363 ovlp:
(0.9995799989919976+0.017712842510821947j)
11 Execution time: 0:00:09.257197 ovlp:
(0.9994287986291166+0.02122965095116225j)
12 Execution time: 0:00:09.265603 ovlp:
(0.9994231986156767+0.023912057388937757j)
13 Execution time: 0:00:09.274690 ovlp:
(0.9992159981183955+0.023284855883654032j)
14 Execution time: 0:00:09.284322 ovlp:
(0.9991263979033549+0.025608861461267507j)
x_points = [np.float64(0.0), np.float64(0.01627884594482672),
np.float64(0.03255769188965344), np.float64(0.048836537834480165),
np.float64(0.06511538377930688), np.float64(0.0813942297241336),
np.float64(0.09767307566896033), np.float64(0.11395192161378705),
np.float64(0.13023076755861376), np.float64(0.1465096135034405),
np.float64(0.1627884594482672), np.float64(0.17906730539309393),
np.float64(0.19534615133792066), np.float64(0.21162499728274736),
np.float64(0.2279038432275741)] y_points = [1.          +0.j
1.          +0.0026040062496151j
1.          +0.00381920916610201j
0.9999663999193598+0.0043064103353847j
0.9999215998118396+0.00758801821124377j
0.9998655996774393+0.00911682188037255j
0.999848799637119 +0.01021442451461874j
0.9997591994220787+0.01202882886918921j
0.999663999193598 +0.01542803702728879j
0.9995855990054376+0.01735444165065991j
0.9995799989919976+0.01771284251082195j
0.9994287986291166+0.02122965095116225j
0.9994231986156767+0.02391205738893776j

```

0.9992159981183955+0.02328485588365403j
0.9991263979033549+0.02560886146126751j]
fit1: [0.16302243708329148 -0.735148151470048]
[0.16302243708329148 -0.735148151470048 0.16303243698329148
-0.] 4.1440940365857585e-11
[1.3982367855232780e-01 -6.3096118919546240e-01
1.3977674904800597e-01
-2.4729739528819022e-01 1.4290371468201423e-06]
7.609393287566781e-11
E_gs: -0.6309611891954624
test mps sampling took: (0.0013089179992675781, Counter({2: 8, 0: 2}))
truncated ham size: 12 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.04786394294491862
1 Execution time: 0:00:09.548096 ovlp:
(0.9999659999251997+0.0024514053930919655j)
2 Execution time: 0:00:09.549890 ovlp:
(0.9998707997157594+0.011631425589136324j)
3 Execution time: 0:00:09.552337 ovlp:
(0.9995511990126378+0.01812543987596782j)
4 Execution time: 0:00:09.555466 ovlp:
(0.999381198638637+0.020723045590700373j)
5 Execution time: 0:00:09.559155 ovlp:
(0.9990275978607153+0.025836656840644956j)
6 Execution time: 0:00:09.563494 ovlp:
(0.9983747964245522+0.03444547578004675j)
7 Execution time: 0:00:09.568610 ovlp:
(0.9980007956017503+0.03976988749375243j)
8 Execution time: 0:00:09.574304 ovlp:
(0.9974431943750277+0.04111629045583909j)
9 Execution time: 0:00:09.580813 ovlp:
(0.9966747926845438+0.05234311515485324j)
10 Execution time: 0:00:09.587918 ovlp:
(0.996062791338141+0.056069523352951345j)
11 Execution time: 0:00:09.595632 ovlp:
(0.9948115885854949+0.0602719325982517j)
12 Execution time: 0:00:09.604015 ovlp:
(0.9943899876579729+0.06631714589772097j)
13 Execution time: 0:00:09.613006 ovlp:
(0.9931727849801271+0.07043795496350103j)
14 Execution time: 0:00:09.622706 ovlp:
(0.9919759823471612+0.07793157144945728j)
15 Execution time: 0:00:09.633126 ovlp:
(0.9909015799834759+0.0848947867685308j)
16 Execution time: 0:00:09.645955 ovlp:
(0.9898747777245109+0.08590798899757579j)


```

17 Execution time: 0:00:09.658001 ovlp:
(0.9886099749419448+0.09244280337416733j)
x_points = [np.float64(0.0), np.float64(0.04786394294491862),
np.float64(0.09572788588983724), np.float64(0.14359182883475585),
np.float64(0.1914557717796745), np.float64(0.23931971472459312),
np.float64(0.2871836576695117), np.float64(0.33504760061443034),
np.float64(0.382911543559349), np.float64(0.4307754865042676),
np.float64(0.47863942944918625), np.float64(0.5265033723941048),
np.float64(0.5743673153390234), np.float64(0.6222312582839421),
np.float64(0.6700952012288607), np.float64(0.7179591441737794),
np.float64(0.765823087118698), np.float64(0.8136870300636165)] y_points
= [1.          +0.j
0.9999659999251997+0.00245140539309197j
0.9998707997157594+0.01163142558913632j
0.9995511990126378+0.01812543987596782j
0.999381198638637 +0.02072304559070037j
0.9990275978607153+0.02583665684064496j
0.9983747964245522+0.03444547578004675j
0.9980007956017503+0.03976988749375243j
0.9974431943750277+0.04111629045583909j
0.9966747926845438+0.05234311515485324j
0.996062791338141 +0.05606952335295134j
0.9948115885854949+0.0602719325982517j
0.9943899876579729+0.06631714589772097j
0.9931727849801271+0.07043795496350103j
0.9919759823471612+0.07793157144945728j
0.9909015799834759+0.0848947867685308j
0.9898747777245109+0.08590798899757579j
0.9886099749419448+0.09244280337416733j]
fit1: [ 0.4404681289267335 -0.26193875777531594]
[ 0.4404681289267335 -0.26193875777531594  0.4404781288267335
-0.          ] 1.8600986579122346e-10
[ 3.5017871732541900e-01 -2.6533646627978708e-01
3.5337775035440344e-01
-6.5924036719577125e-02  2.9184432263062826e-06]
3.541151503242081e-10
E_gs: -0.2653364662797871
test mps sampling took: (0.001344919204711914, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.06857758105863017
1 Execution time: 0:00:10.214652 ovlp:
(0.9999271999271999+0.00784700784700787j)
2 Execution time: 0:00:10.216533 ovlp:
(0.9996415996415997+0.016140616140616126j)
3 Execution time: 0:00:10.219092 ovlp:

```

```

(0.9993083993083993+0.02227542227542223j)
4 Execution time: 0:00:10.222382  ovlp:
(0.9986951986951986+0.03212023212023207j)
5 Execution time: 0:00:10.226438  ovlp:
(0.997983997983998+0.04010024010024016j)
6 Execution time: 0:00:10.230996  ovlp:
(0.9969619969619969+0.046445046445046545j)
7 Execution time: 0:00:10.236337  ovlp:
(0.995981995981996+0.05480865480865482j)
x_points = [np.float64(0.0), np.float64(0.06857758105863017),
np.float64(0.13715516211726034), np.float64(0.20573274317589052),
np.float64(0.2743103242345207), np.float64(0.34288790529315083),
np.float64(0.41146548635178104), np.float64(0.4800430674104112)]
y_points = [1.          +0.j
0.9999271999271999+0.00784700784700787j
0.9996415996415997+0.01614061614061613j
0.9993083993083993+0.02227542227542223j
0.9986951986951986+0.03212023212023207j
0.997983997983998 +0.04010024010024016j
0.9969619969619969+0.04644504644504655j
0.995981995981996 +0.05480865480865482j]
fit1: [ 0.4850280314180962 -0.24240581978790665]
[ 0.4850280314180962 -0.24240581978790665 0.4850380313180962
-0.          ] 1.7858899178510977e-11
[ 4.1320747489096987e-01 -2.0645882190425691e-01
4.1327764286518676e-01
-7.9643813258842885e-02 1.4786667071169943e-06]
5.0170047520559075e-11
E_gs: -0.2064588219042569
test mps sampling took: (0.0012891292572021484, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.02615261067081939
1 Execution time: 0:00:10.609085  ovlp:
(0.9999815999742399+0.001513402118763052j)
2 Execution time: 0:00:10.611010  ovlp:
(0.9999447999227198+0.00928741300237812j)
3 Execution time: 0:00:10.613667  ovlp:
(0.9998343997681596+0.010428214599500496j)
4 Execution time: 0:00:10.617451  ovlp:
(0.9998251997552796+0.009756613659259061j)
5 Execution time: 0:00:10.621729  ovlp:
(0.9996779995491993+0.012774217883904981j)
6 Execution time: 0:00:10.627146  ovlp:
(0.999503199304479+0.017788224903514838j)
7 Execution time: 0:00:10.633030  ovlp:

```

```

(0.999447999227199+0.020382628535679848j)
8 Execution time: 0:00:10.639081 ovlp:
(0.9992547989567186+0.024899834859768877j)
9 Execution time: 0:00:10.645777 ovlp:
(0.9988775984286378+0.02700663780929302j)
10 Execution time: 0:00:10.653053 ovlp:
(0.9988407983771177+0.0307970431158604j)
11 Execution time: 0:00:10.660990 ovlp:
(0.9987119981967976+0.029913841879378733j)
12 Execution time: 0:00:10.669476 ovlp:
(0.9981231973724762+0.03953705535187746j)
13 Execution time: 0:00:10.678804 ovlp:
(0.9981047973467163+0.04028225639515903j)
14 Execution time: 0:00:10.688642 ovlp:
(0.9976631967284755+0.0431710604394846j)
15 Execution time: 0:00:10.699274 ovlp:
(0.9975803966125552+0.04715466601653251j)
16 Execution time: 0:00:10.710588 ovlp:
(0.9970283958397541+0.04986866981613769j)
17 Execution time: 0:00:10.724091 ovlp:
(0.9967247954147136+0.054606676449347136j)
18 Execution time: 0:00:10.736739 ovlp:
(0.9960531944744722+0.052564273589982946j)
19 Execution time: 0:00:10.749990 ovlp:
(0.9957495940494316+0.052987474182463856j)
20 Execution time: 0:00:10.763805 ovlp:
(0.9949859929803901+0.056731879424631204j)
21 Execution time: 0:00:10.780313 ovlp:
(0.9946363924909496+0.06652989314185032j)
22 Execution time: 0:00:10.795658 ovlp:
(0.9936611911256676+0.069335897070256j)
23 Execution time: 0:00:10.811660 ovlp:
(0.993385190739267+0.06861829606561454j)
x_points = [np.float64(0.0), np.float64(0.02615261067081939),
np.float64(0.05230522134163878), np.float64(0.07845783201245816),
np.float64(0.10461044268327756), np.float64(0.13076305335409694),
np.float64(0.15691566402491633), np.float64(0.18306827469573572),
np.float64(0.20922088536655511), np.float64(0.2353734960373745),
np.float64(0.2615261067081939), np.float64(0.2876787173790133),
np.float64(0.31383132804983266), np.float64(0.3399839387206521),
np.float64(0.36613654939147144), np.float64(0.39228916006229086),
np.float64(0.41844177073311023), np.float64(0.4445943814039296),
np.float64(0.470746992074749), np.float64(0.4968996027455684),
np.float64(0.5230522134163877), np.float64(0.5492048240872072),
np.float64(0.5753574347580266), np.float64(0.601510045428846)] y_points
= [1.          +0.j
0.9999815999742399+0.00151340211876305j

```

0.9999447999227198+0.00928741300237812j
 0.9998343997681596+0.0104282145995005j
 0.9998251997552796+0.00975661365925906j
 0.9996779995491993+0.01277421788390498j
 0.999503199304479 +0.01778822490351484j
 0.999447999227199 +0.02038262853567985j
 0.9992547989567186+0.02489983485976888j
 0.9988775984286378+0.02700663780929302j
 0.9988407983771177+0.0307970431158604j
 0.9987119981967976+0.02991384187937873j
 0.9981231973724762+0.03953705535187746j
 0.9981047973467163+0.04028225639515903j
 0.9976631967284755+0.0431710604394846j
 0.9975803966125552+0.04715466601653251j
 0.9970283958397541+0.04986866981613769j
 0.9967247954147136+0.05460667644934714j
 0.9960531944744722+0.05256427358998295j
 0.9957495940494316+0.05298747418246386j
 0.9949859929803901+0.0567318794246312j
 0.9946363924909496+0.06652989314185032j
 0.9936611911256676+0.069335897070256j
 0.993385190739267 +0.06861829606561454j
 fit1: [0.34880235807233223 -0.33169666255280206]
 [0.34880235807233223 -0.33169666255280206 0.34881235797233223
 -0.] 6.480223429672004e-10
 [3.0110201479668391e-01 -2.8564475340938322e-01
 3.0153305948339654e-01
 -9.9434573317508324e-02 1.3489201392542507e-06]
 7.527149378857853e-10
 E_gs: -0.2856447534093832
 test mps sampling took: (0.0012831687927246094, Counter({0: 5, 2: 5}))
 truncated ham size: 12 Number of fitting points: 13
 shots per matrix element: 416666.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.15830779535175166
 1 Execution time: 0:00:11.440463 ovlp:
 (0.9995919993471989+0.017788828462125483j)
 2 Execution time: 0:00:11.442328 ovlp:
 (0.9980847969356752+0.033777654044246486j)
 3 Execution time: 0:00:11.445224 ovlp:
 (0.9958479933567894+0.05563688901902242j)
 4 Execution time: 0:00:11.448638 ovlp:
 (0.992555188088301+0.07605132168211459j)
 5 Execution time: 0:00:11.453044 ovlp:
 (0.9890703825126119+0.09485295176472275j)
 6 Execution time: 0:00:11.458370 ovlp:
 (0.9842703748325998+0.10730417168667472j)

```

7 Execution time: 0:00:11.463874  ovlp:
(0.9784719655551448+0.12596180153888237j)
8 Execution time: 0:00:11.470024  ovlp:
(0.9719679551487281+0.1427330283728454j)
9 Execution time: 0:00:11.476585  ovlp:
(0.9634431415090263+0.159801855682969j)
10 Execution time: 0:00:11.483943  ovlp:
(0.9568959310334897+0.17438427901484643j)
11 Execution time: 0:00:11.491844  ovlp:
(0.947641516226426+0.19238430781489257j)
12 Execution time: 0:00:11.500461  ovlp:
(0.9381951011121619+0.21012993620789788j)
x_points = [np.float64(0.0), np.float64(0.15830779535175166),
np.float64(0.3166155907035033), np.float64(0.47492338605525497),
np.float64(0.6332311814070066), np.float64(0.7915389767587583),
np.float64(0.9498467721105099), np.float64(1.1081545674622615),
np.float64(1.2664623628140133), np.float64(1.424770158165765),
np.float64(1.5830779535175166), np.float64(1.7413857488692681),
np.float64(1.8996935442210199)] y_points = [1.          +0.j
0.9995919993471989+0.01778882846212548j
0.9980847969356752+0.03377765404424649j
0.9958479933567894+0.05563688901902242j
0.992555188088301 +0.07605132168211459j
0.9890703825126119+0.09485295176472275j
0.9842703748325998+0.10730417168667472j
0.9784719655551448+0.12596180153888237j
0.9719679551487281+0.1427330283728454j
0.9634431415090263+0.159801855682969j
0.9568959310334897+0.17438427901484643j
0.947641516226426 +0.19238430781489257j
0.9381951011121619+0.21012993620789788j]
fit1: [ 0.3881263688937324 -0.29970727082124465]
[ 0.3881263688937324 -0.29970727082124465 0.3881363687937324
-0.          ] 2.1452968698306812e-10
[ 2.8503150740319932e-01 -3.4903303414270126e-01
3.1292157378881086e-01
-5.5128349468313305e-02  5.4965737981548106e-06]
1.8122365086652323e-10
E_gs: -0.34903303414270126
test mps sampling took: (0.0012960433959960938, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.13189020157962092
1 Execution time: 0:00:11.984745  ovlp:
(0.9997328000000001+0.0165455999999999938j)
2 Execution time: 0:00:11.986604  ovlp:

```

```

(0.9987824000000001+0.031102399999999975j)
3 Execution time: 0:00:11.989105  ovlp:
(0.9972352+0.047228800000000007j)
4 Execution time: 0:00:11.992740  ovlp:
(0.995128+0.062803200000000006j)
x_points = [np.float64(0.0), np.float64(0.13189020157962092),
np.float64(0.26378040315924184), np.float64(0.39567060473886273),
np.float64(0.5275608063184837)] y_points = [1.          +0.j
0.9997328000000001+0.016545599999999994j
0.9987824000000001+0.03110239999999997j
0.9972352      +0.047228800000000007j
0.995128      +0.062803200000000006j]
fit1: [ 0.2878883610884764 -0.43176873826956086]
[ 0.2878883610884764 -0.43176873826956086  0.2878983609884764
-0.          ] 8.250289010870227e-11
[ 2.4345592682817549e-01 -3.6512818915661449e-01
2.4346103644469225e-01
-1.4770101767955815e-01  1.5437768010903629e-06]
4.3849352106332824e-11
E_gs: -0.3651281891566145
test mps sampling took: (0.0013623237609863281, Counter({2: 6, 0: 4}))
truncated ham size: 12  Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.23322309149954293
1 Execution time: 0:00:12.498695  ovlp:
(0.9990207984332775+0.026558442493507917j)
2 Execution time: 0:00:12.500640  ovlp:
(0.9965151944243111+0.05406248649997836j)
3 Execution time: 0:00:12.503282  ovlp:
(0.9914751863602982+0.0819793311669299j)
4 Execution time: 0:00:12.506532  ovlp:
(0.9844479751167601+0.1078705725929161j)
5 Execution time: 0:00:12.511394  ovlp:
(0.9758367613388181+0.1384658215453145j)
6 Execution time: 0:00:12.516481  ovlp:
(0.9655647449035918+0.1576082521732034j)
7 Execution time: 0:00:12.521710  ovlp:
(0.9532383251813203+0.18634109814575694j)
8 Execution time: 0:00:12.528017  ovlp:
(0.9408255053208086+0.2051379282206851j)
9 Execution time: 0:00:12.535444  ovlp:
(0.9246302794084471+0.22700676321082103j)
10 Execution time: 0:00:12.542760  ovlp:
(0.9090590544944872+0.24750279600447356j)
11 Execution time: 0:00:12.550651  ovlp:
(0.8900414240662784+0.267240427584684j)

```

```

12 Execution time: 0:00:12.559366 ovlp:
(0.870706993131189+0.2888884622215395j)
13 Execution time: 0:00:12.569703 ovlp:
(0.8520541632866612+0.3051412882260611j)
14 Execution time: 0:00:12.580655 ovlp:
(0.8297341275746042+0.32057811292498073j)
15 Execution time: 0:00:12.591451 ovlp:
(0.8107548972078356+0.32896852634964224j)
16 Execution time: 0:00:12.602896 ovlp:
(0.7864092582548132+0.34150614640983434j)
17 Execution time: 0:00:12.614798 ovlp:
(0.7649628239405184+0.35055896089433736j)
18 Execution time: 0:00:12.627386 ovlp:
(0.7407803852486163+0.35899737439579904j)
19 Execution time: 0:00:12.642308 ovlp:
(0.7155227448363917+0.36756058809694103j)
20 Execution time: 0:00:12.660103 ovlp:
(0.6905531048849678+0.3735509976815963j)
21 Execution time: 0:00:12.676931 ovlp:
(0.670719473151157+0.37403099844959753j)
22 Execution time: 0:00:12.693098 ovlp:
(0.6449818319709311+0.3764310022896036j)
23 Execution time: 0:00:12.710749 ovlp:
(0.6235257976412762+0.3762390019824031j)
24 Execution time: 0:00:12.728303 ovlp:
(0.5985081576130522+0.37276379642207425j)
x_points = [np.float64(0.0), np.float64(0.23322309149954293),
np.float64(0.46644618299908586), np.float64(0.6996692744986288),
np.float64(0.9328923659981717), np.float64(1.1661154574977146),
np.float64(1.3993385489972576), np.float64(1.6325616404968004),
np.float64(1.8657847319963434), np.float64(2.0990078234958864),
np.float64(2.3322309149954292), np.float64(2.565454006494972),
np.float64(2.7986770979945153), np.float64(3.031900189494058),
np.float64(3.265123280993601), np.float64(3.498346372493144),
np.float64(3.731569463992687), np.float64(3.9647925554922296),
np.float64(4.198015646991773), np.float64(4.431238738491316),
np.float64(4.6644618299908585), np.float64(4.897684921490401),
np.float64(5.130908012989944), np.float64(5.364131104489488),
np.float64(5.5973541959890305)] y_points = [1.          +0.j
0.9990207984332775+0.02655844249350792j
0.9965151944243111+0.05406248649997836j
0.9914751863602982+0.0819793311669299j
0.9844479751167601+0.1078705725929161j
0.9758367613388181+0.1384658215453145j
0.9655647449035918+0.1576082521732034j
0.9532383251813203+0.18634109814575694j
0.9408255053208086+0.2051379282206851j

```

0.9246302794084471+0.22700676321082103j
 0.9090590544944872+0.24750279600447356j
 0.8900414240662784+0.267240427584684j
 0.870706993131189 +0.2888884622215395j
 0.8520541632866612+0.3051412882260611j
 0.8297341275746042+0.32057811292498073j
 0.8107548972078356+0.32896852634964224j
 0.7864092582548132+0.34150614640983434j
 0.7649628239405184+0.35055896089433736j
 0.7407803852486163+0.35899737439579904j
 0.7155227448363917+0.36756058809694103j
 0.6905531048849678+0.3735509976815963j
 0.670719473151157 +0.37403099844959753j
 0.6449818319709311+0.3764310022896036j
 0.6235257976412762+0.3762390019824031j
 0.5985081576130522+0.37276379642207425j]
 fit1: [0.37999678088195765 -0.295935325698711]
 [0.28152385248838496 -0.3478200199975829 0.379339542990965
 -0.05180680262728903] 6.74496453301654e-10
 [0.2819687144060205 -0.34757726018924967 0.2782847730518673
 -0.05937163111869443 -0.00696076549604824] 6.842641154236544e-10
 E_gs: -0.34757726018924967
 test mps sampling took: (0.001354217529296875, Counter({0: 6, 2: 4}))
 truncated ham size: 12 Number of fitting points: 19
 shots per matrix element: 277777.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.04816854885817465
 1 Execution time: 0:00:13.334649 ovlp:
 (0.9999495998588797+0.006490818174290869j)
 2 Execution time: 0:00:13.336643 ovlp:
 (0.9997695993548783+0.011185231318647793j)
 3 Execution time: 0:00:13.339190 ovlp:
 (0.9997119991935977+0.019321254099511576j)
 4 Execution time: 0:00:13.342313 ovlp:
 (0.9993735982460752+0.02013485637759782j)
 5 Execution time: 0:00:13.347290 ovlp:
 (0.9989631970969519+0.029271681960709506j)
 6 Execution time: 0:00:13.352896 ovlp:
 (0.9984303956051077+0.03358449403658326j)
 7 Execution time: 0:00:13.359226 ovlp:
 (0.997703193568942+0.03669490274572773j)
 8 Execution time: 0:00:13.366405 ovlp:
 (0.9976095933068612+0.04588932849011984j)
 9 Execution time: 0:00:13.373625 ovlp:
 (0.9967383908674945+0.05211734592856865j)
 10 Execution time: 0:00:13.382475 ovlp:
 (0.9960327888918088+0.05694855945596644j)


```

11 Execution time: 0:00:13.391044  ovlp:
(0.9949023857266801+0.06216857407200749j)
12 Execution time: 0:00:13.400149  ovlp:
(0.994124783549394+0.06880699265957935j)
13 Execution time: 0:00:13.411377  ovlp:
(0.9926487794165824+0.06850459181285706j)
14 Execution time: 0:00:13.423094  ovlp:
(0.9920223776626576+0.0790886214481401j)
15 Execution time: 0:00:13.434371  ovlp:
(0.9910863750418502+0.08097502673007484j)
16 Execution time: 0:00:13.447498  ovlp:
(0.9889263689938332+0.0914870561637573j)
17 Execution time: 0:00:13.461917  ovlp:
(0.9889335690139933+0.09639026989275568j)
18 Execution time: 0:00:13.476894  ovlp:
(0.9862623615346122+0.09855027594077259j)
x_points = [np.float64(0.0), np.float64(0.04816854885817465),
np.float64(0.0963370977163493), np.float64(0.14450564657452394),
np.float64(0.1926741954326986), np.float64(0.24084274429087324),
np.float64(0.2890112931490479), np.float64(0.3371798420072225),
np.float64(0.3853483908653972), np.float64(0.43351693972357186),
np.float64(0.4816854885817465), np.float64(0.5298540374399211),
np.float64(0.5780225862980958), np.float64(0.6261911351562705),
np.float64(0.674359684014445), np.float64(0.7225282328726197),
np.float64(0.7706967817307944), np.float64(0.818865330588969),
np.float64(0.8670338794471437)] y_points = [1.          +0.j
0.9999495998588797+0.00649081817429087j
0.9997695993548783+0.01118523131864779j
0.9997119991935977+0.01932125409951158j
0.9993735982460752+0.02013485637759782j
0.9989631970969519+0.02927168196070951j
0.9984303956051077+0.03358449403658326j
0.997703193568942 +0.03669490274572773j
0.9976095933068612+0.04588932849011984j
0.9967383908674945+0.05211734592856865j
0.9960327888918088+0.05694855945596644j
0.9949023857266801+0.06216857407200749j
0.994124783549394 +0.06880699265957935j
0.9926487794165824+0.06850459181285706j
0.9920223776626576+0.0790886214481401j
0.9910863750418502+0.08097502673007484j
0.9889263689938332+0.0914870561637573j
0.9889335690139933+0.09639026989275568j
0.9862623615346122+0.09855027594077259j]
fit1: [ 0.3812324938194871 -0.3045364616646287]
[ 0.3812324938194871 -0.3045364616646287  0.3812424937194871
-0.          ] 2.400675412507739e-10

```

[2.807287385967721e-01 -3.197082051272925e-01
3.068392552963494e-01
-8.551104288360531e-02 3.885480669636918e-06]
3.198843243218246e-10
E_gs: -0.3197082051272925
test mps sampling took: (0.0012767314910888672, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.283499242000097
1 Execution time: 0:00:13.988866 ovlp:
(0.9985483950645433+0.032813111564579334j)
2 Execution time: 0:00:13.990786 ovlp:
(0.9941783802064927+0.06930083562284106j)
3 Execution time: 0:00:13.993374 ovlp:
(0.9873459569762537+0.09891813632166357j)
4 Execution time: 0:00:13.996694 ovlp:
(0.9776407239784615+0.12454542345443964j)
5 Execution time: 0:00:14.000544 ovlp:
(0.9653134820658391+0.158213537926029j)
6 Execution time: 0:00:14.006508 ovlp:
(0.949307827646614+0.18858324118301995j)
7 Execution time: 0:00:14.012244 ovlp:
(0.9328081715477832+0.216961737669908j)
8 Execution time: 0:00:14.019506 ovlp:
(0.9136105062757214+0.2442838305650239j)
9 Execution time: 0:00:14.026417 ovlp:
(0.8915552312877864+0.26496350087590304j)
10 Execution time: 0:00:14.033659 ovlp:
(0.8679495510284736+0.28622077315062877j)
11 Execution time: 0:00:14.041526 ovlp:
(0.8445338714151629+0.30788084679487904j)
12 Execution time: 0:00:14.050146 ovlp:
(0.816793777098842+0.3258245078033266j)
13 Execution time: 0:00:14.059600 ovlp:
(0.7910600896043047+0.33856975113715393j)
14 Execution time: 0:00:14.070073 ovlp:
(0.7622027914894911+0.3551682075719058j)
15 Execution time: 0:00:14.082198 ovlp:
(0.7323498899896259+0.3621374312672663j)
16 Execution time: 0:00:14.093695 ovlp:
(0.7065402022366876+0.37025425886448016j)
17 Execution time: 0:00:14.105702 ovlp:
(0.6762388992122572+0.3760986787355076j)
18 Execution time: 0:00:14.118281 ovlp:
(0.6487420057228195+0.3759922783737464j)
19 Execution time: 0:00:14.131525 ovlp:

```

(0.6197707072204046+0.37715508232728j)
x_points = [np.float64(0.0), np.float64(0.283499242000097),
np.float64(0.566998484000194), np.float64(0.850497726000291),
np.float64(1.133996968000388), np.float64(1.417496210000485),
np.float64(1.700995452000582), np.float64(1.9844946940006791),
np.float64(2.267993936000776), np.float64(2.5514931780008734),
np.float64(2.83499242000097), np.float64(3.118491662001067),
np.float64(3.401990904001164), np.float64(3.6854901460012615),
np.float64(3.9689893880013583), np.float64(4.252488630001455),
np.float64(4.535987872001552), np.float64(4.8194871140016495),
np.float64(5.102986356001747), np.float64(5.386485598001843)] y_points =
[1.          +0.j
0.9985483950645433+0.03281311156457933j
0.9941783802064927+0.06930083562284106j
0.9873459569762537+0.09891813632166357j
0.9776407239784615+0.12454542345443964j
0.9653134820658391+0.158213537926029j
0.949307827646614 +0.18858324118301995j
0.9328081715477832+0.216961737669908j
0.9136105062757214+0.2442838305650239j
0.8915552312877864+0.26496350087590304j
0.8679495510284736+0.28622077315062877j
0.8445338714151629+0.30788084679487904j
0.816793777098842 +0.3258245078033266j
0.7910600896043047+0.33856975113715393j
0.7622027914894911+0.3551682075719058j
0.7323498899896259+0.3621374312672663j
0.7065402022366876+0.37025425886448016j
0.6762388992122572+0.3760986787355076j
0.6487420057228195+0.3759922783737464j
0.6197707072204046+0.37715508232728j ]
fit1: [ 0.3805520528330792 -0.2960779585177148]
[ 0.3234827807386993 -0.3243402463015584  0.3803293623365115
-0.02823617166927797] 1.0347092736977983e-09
[ 0.2944744463672457 -0.3374216016637028  0.2778084369860511
-0.06443897072079047  0.00217452434142594] 6.616683588539927e-10
E_gs: -0.3374216016637028
test mps sampling took: (0.0013275146484375, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.06799385484316144
1 Execution time: 0:00:14.529181 ovlp:
(0.9999099999099998+0.008476208476208447j)
2 Execution time: 0:00:14.531189 ovlp:
(0.9996435996435997+0.018876618876618956j)
3 Execution time: 0:00:14.533829 ovlp:

```

```

(0.9992763992763993+0.02156222156222154j)
4 Execution time: 0:00:14.537108  ovlp:
(0.9987543987543988+0.0332226332226333j)
5 Execution time: 0:00:14.540925  ovlp:
(0.9978975978975979+0.03735903735903734j)
6 Execution time: 0:00:14.545377  ovlp:
(0.9968931968931969+0.04588024588024586j)
7 Execution time: 0:00:14.551635  ovlp:
(0.9960903960903962+0.055927855927855985j)
8 Execution time: 0:00:14.558538  ovlp:
(0.9947295947295947+0.06054666054666047j)
9 Execution time: 0:00:14.565923  ovlp:
(0.9932643932643932+0.07036387036387026j)
x_points = [np.float64(0.0), np.float64(0.06799385484316144),
np.float64(0.13598770968632287), np.float64(0.2039815645294843),
np.float64(0.27197541937264574), np.float64(0.3399692742158072),
np.float64(0.4079631290589686), np.float64(0.47595698390213004),
np.float64(0.5439508387452915), np.float64(0.6119446935884529)]
y_points = [1.          +0.j
0.9999099999099998+0.00847620847620845j
0.9996435996435997+0.01887661887661896j
0.9992763992763993+0.02156222156222154j
0.9987543987543988+0.0332226332226333j
0.9978975978975979+0.03735903735903734j
0.9968931968931969+0.04588024588024586j
0.9960903960903962+0.05592785592785599j
0.9947295947295947+0.06054666054666047j
0.9932643932643932+0.07036387036387026j]
fit1: [ 0.2770802918375018 -0.41613633942944067]
[ 0.2770802918375018 -0.41613633942944067 0.2770902917375018
-0.          ] 1.1500568701337326e-10
[ 2.3731517748592898e-01 -3.5638303148792366e-01
2.3730091729416575e-01
-1.4194811008914041e-01 1.4383029711058566e-06]
1.708334988704583e-10
E_gs: -0.35638303148792366
test mps sampling took: (0.0013318061828613281, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.16271035461759653
1 Execution time: 0:00:15.122221  ovlp:
(0.9995639999999999+0.018543999999999894j)
2 Execution time: 0:00:15.124205  ovlp: (0.998056+0.03710799999999992j)
3 Execution time: 0:00:15.126797  ovlp:
(0.995768+0.0566800000000000064j)
4 Execution time: 0:00:15.129970  ovlp: (0.992472+0.07417199999999999j)

```

```

5 Execution time: 0:00:15.133794  ovlp:
(0.9883200000000001+0.09421600000000008j)
6 Execution time: 0:00:15.138339  ovlp:
(0.9837880000000001+0.11022799999999999j)
7 Execution time: 0:00:15.143594  ovlp:
(0.9775640000000001+0.1299920000000001j)
8 Execution time: 0:00:15.149574  ovlp:
(0.9705919999999999+0.1486199999999997j)
9 Execution time: 0:00:15.156156  ovlp: (0.962788+0.16470000000000007j)
10 Execution time: 0:00:15.163561  ovlp:
(0.9540360000000001+0.18235599999999996j)
x_points = [np.float64(0.0), np.float64(0.16271035461759653),
np.float64(0.32542070923519306), np.float64(0.4881310638527896),
np.float64(0.6508414184703861), np.float64(0.8135517730879827),
np.float64(0.9762621277055792), np.float64(1.1389724823231757),
np.float64(1.3016828369407722), np.float64(1.4643931915583688),
np.float64(1.6271035461759653)] y_points = [1.          +0.j
0.9995639999999999+0.01854399999999989j
0.998056          +0.03710799999999992j
0.995768          +0.05668000000000006j
0.992472          +0.07417199999999999j
0.9883200000000001+0.09421600000000008j
0.9837880000000001+0.11022799999999999j
0.9775640000000001+0.1299920000000001j
0.9705919999999999+0.1486199999999997j
0.962788          +0.16470000000000007j
0.9540360000000001+0.18235599999999996j]
fit1: [ 0.3954134132532981 -0.2938155213069187]
[ 0.3954134132532981 -0.2938155213069187  0.3954234131532981
 -0.          ] 1.1262516307892366e-11
[ 3.0342003866033485e-01 -3.3414984075696397e-01
 2.4473473500819901e-01
 -6.0127923076429474e-02  3.9502005215157427e-06]
1.227682747681151e-11
E_gs: -0.33414984075696397
test mps sampling took: (0.0013387203216552734, Counter({0: 6, 2: 4}))
truncated ham size: 12  Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.2007981730844666
1 Execution time: 0:00:15.721842  ovlp:
(0.9992979992979993+0.021963021963022022j)
2 Execution time: 0:00:15.723693  ovlp:
(0.9969099969099968+0.04796104796104794j)
3 Execution time: 0:00:15.726835  ovlp:
(0.9935079935079936+0.06943506943506939j)
4 Execution time: 0:00:15.730462  ovlp:

```

```

(0.9886659886659888+0.09158109158109151j)
5 Execution time: 0:00:15.734337  ovlp:
(0.9822879822879822+0.11232311232311232j)
6 Execution time: 0:00:15.739467  ovlp:
(0.9744579744579744+0.1344631344631344j)
7 Execution time: 0:00:15.745564  ovlp:
(0.9658419658419659+0.16159516159516163j)
8 Execution time: 0:00:15.751484  ovlp:
(0.9556059556059555+0.1806211806211806j)
9 Execution time: 0:00:15.758988  ovlp:
(0.9432699432699432+0.1972471972471972j)
10 Execution time: 0:00:15.767386  ovlp:
(0.9318279318279319+0.21871521871521882j)
11 Execution time: 0:00:15.775386  ovlp:
(0.9164079164079164+0.2368052368052369j)
12 Execution time: 0:00:15.784041  ovlp:
(0.9014919014919014+0.2534612534612535j)
13 Execution time: 0:00:15.793250  ovlp:
(0.8872958872958874+0.2727092727092728j)
14 Execution time: 0:00:15.803156  ovlp:
(0.8695838695838696+0.286113286113286j)
15 Execution time: 0:00:15.813635  ovlp:
(0.8546858546858547+0.3024873024873025j)
x_points = [np.float64(0.0), np.float64(0.2007981730844666),
np.float64(0.4015963461689332), np.float64(0.6023945192533998),
np.float64(0.8031926923378664), np.float64(1.003990865422333),
np.float64(1.2047890385067996), np.float64(1.4055872115912662),
np.float64(1.6063853846757328), np.float64(1.8071835577601993),
np.float64(2.007981730844666), np.float64(2.2087799039291327),
np.float64(2.4095780770135993), np.float64(2.610376250098066),
np.float64(2.8111744231825324), np.float64(3.011972596266999)] y_points =
[1.          +0.j
0.9992979992979993+0.02196302196302202j
0.9969099969099968+0.04796104796104794j
0.9935079935079936+0.06943506943506939j
0.9886659886659888+0.09158109158109151j
0.9822879822879822+0.11232311232311232j
0.9744579744579744+0.1344631344631344j
0.9658419658419659+0.16159516159516163j
0.9556059556059555+0.1806211806211806j
0.9432699432699432+0.1972471972471972j
0.9318279318279319+0.21871521871521882j
0.9164079164079164+0.2368052368052369j
0.9014919014919014+0.2534612534612535j
0.8872958872958874+0.2727092727092728j
0.8695838695838696+0.286113286113286j
0.8546858546858547+0.3024873024873025j ]

```

```

fit1: [ 0.38395899593345734 -0.3015649966744803 ]
[ 0.38395899593345734 -0.3015649966744803 0.38396899583345734
-0.          ] 1.723209742141493e-10
[ 2.8026732060099446e-01 -3.4921379417978410e-01
2.9474895015742797e-01
-6.4564089549184647e-02 4.8371798555740668e-06]
1.7122816672880937e-10
E_gs: -0.3492137941797841
test mps sampling took: (0.0014848709106445312, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.004435063725068812
1 Execution time: 0:00:16.288552 ovlp: (1+0.0026256042009666913j)
2 Execution time: 0:00:16.290577 ovlp: (1+0.001579202526724055j)
3 Execution time: 0:00:16.293247 ovlp: (1+0.005668809070094483j)
4 Execution time: 0:00:16.296432 ovlp: (1+0.0013296021273634384j)
5 Execution time: 0:00:16.300324 ovlp:
(0.99999039998464+0.0025584040934465424j)
6 Execution time: 0:00:16.304912 ovlp:
(0.99998079996928+0.005726409162254642j)
7 Execution time: 0:00:16.310095 ovlp:
(0.99997119995392+0.003931206289930156j)
8 Execution time: 0:00:16.317115 ovlp:
(0.99998079996928+0.00436320698113124j)
9 Execution time: 0:00:16.324918 ovlp:
(0.9999615999385598+0.005880009408015141j)
10 Execution time: 0:00:16.332534 ovlp:
(0.9999519999231998-0.00036960059136093015j)
11 Execution time: 0:00:16.341742 ovlp:
(0.9999519999231998+0.0022704036326457455j)
12 Execution time: 0:00:16.351467 ovlp:
(0.9999423999078398+0.0019152030643247997j)
13 Execution time: 0:00:16.360666 ovlp:
(0.9998847998156797+0.005227208363533409j)
14 Execution time: 0:00:16.370701 ovlp:
(0.9999135998617599+0.00830881329410138j)
15 Execution time: 0:00:16.382830 ovlp:
(0.9999039998463997+0.007819212510739915j)
16 Execution time: 0:00:16.394377 ovlp:
(0.9999039998463997+0.00912481459970338j)
17 Execution time: 0:00:16.407921 ovlp:
(0.9998847998156797+0.008500813601301838j)
18 Execution time: 0:00:16.420635 ovlp:
(0.9998751998003197+0.005793609269774791j)
19 Execution time: 0:00:16.433852 ovlp:
(0.9999039998463997+0.010804817287707769j)

```

```
20 Execution time: 0:00:16.447687  ovlp:
(0.9998271997235195+0.009403215045143964j)
21 Execution time: 0:00:16.462218  ovlp:
(0.9998271997235195+0.011755218808350065j)
22 Execution time: 0:00:16.477520  ovlp:
(0.9997983996774396+0.011620818593309767j)
23 Execution time: 0:00:16.493474  ovlp:
(0.9998271997235195+0.008980814369303092j)
24 Execution time: 0:00:16.509989  ovlp:
(0.9999231998771199+0.016401626242601886j)
x_points = [np.float64(0.0), np.float64(0.004435063725068812),
np.float64(0.008870127450137624), np.float64(0.013305191175206435),
np.float64(0.017740254900275247), np.float64(0.02217531862534406),
np.float64(0.02661038235041287), np.float64(0.03104544607548168),
np.float64(0.035480509800550494), np.float64(0.03991557352561931),
np.float64(0.04435063725068812), np.float64(0.04878570097575693),
np.float64(0.05322076470082574), np.float64(0.057655828425894555),
np.float64(0.06209089215096336), np.float64(0.06652595587603218),
np.float64(0.07096101960110099), np.float64(0.0753960833261698),
np.float64(0.07983114705123862), np.float64(0.08426621077630743),
np.float64(0.08870127450137624), np.float64(0.09313633822644504),
np.float64(0.09757140195151386), np.float64(0.10200646567658267),
np.float64(0.10644152940165148)] y_points = [1.          +0.j
1.          +0.00262560420096669j
1.          +0.00157920252672406j
1.          +0.00566880907009448j
1.          +0.00132960212736344j
0.99999039998464 +0.00255840409344654j
0.99998079996928 +0.00572640916225464j
0.99997119995392 +0.00393120628993016j
0.99998079996928 +0.00436320698113124j
0.9999615999385598+0.00588000940801514j
0.9999519999231998-0.00036960059136093j
0.9999519999231998+0.00227040363264575j
0.9999423999078398+0.0019152030643248j
0.9998847998156797+0.00522720836353341j
0.9999135998617599+0.00830881329410138j
0.9999039998463997+0.00781921251073991j
0.9999039998463997+0.00912481459970338j
0.9998847998156797+0.00850081360130184j
0.9998751998003197+0.00579360926977479j
0.9999039998463997+0.01080481728770777j
0.9998271997235195+0.00940321504514396j
0.9998271997235195+0.01175521880835007j
0.9997983996774396+0.01162081859330977j
0.9998271997235195+0.00898081436930309j
0.9999231998771199+0.01640162624260189j]
```



```

fit1: [ 0.12068114780260265 -0.9054850164571964 ]
[ 0.12068114780260265 -0.9054850164571964 0.12069114770260266
-0.          ] 1.0608496409998777e-09
[ 1.0993949308864255e-01 -8.2518303069583099e-01
1.0992638402722857e-01
-3.6215744089745633e-01 8.9420338995190162e-07]
1.775621071375559e-09
E_gs: -0.825183030695831
test mps sampling took: (0.0012958049774169922, Counter({0: 9, 2: 1}))
truncated ham size: 12 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1334322475613052
1 Execution time: 0:00:16.733297 ovlp:
(0.9997143997143998+0.017602217602217696j)
2 Execution time: 0:00:16.735161 ovlp:
(0.9989163989163989+0.0298914298914299j)
3 Execution time: 0:00:16.737644 ovlp:
(0.9972699972699972+0.047229047229047305j)
4 Execution time: 0:00:16.740754 ovlp:
(0.9947667947667949+0.06383586383586382j)
5 Execution time: 0:00:16.745260 ovlp:
(0.9921459921459921+0.0737898737898739j)
6 Execution time: 0:00:16.749849 ovlp:
(0.9884163884163883+0.09275709275709265j)
7 Execution time: 0:00:16.755018 ovlp:
(0.9844515844515844+0.10806190806190807j)
8 Execution time: 0:00:16.760853 ovlp:
(0.9794787794787794+0.11886431886431881j)
9 Execution time: 0:00:16.767430 ovlp:
(0.9749763749763749+0.14077154077154086j)
10 Execution time: 0:00:16.774726 ovlp:
(0.9688947688947689+0.15169995169995176j)
11 Execution time: 0:00:16.782708 ovlp:
(0.9625107625107625+0.16828156828156837j)
12 Execution time: 0:00:16.791249 ovlp:
(0.9558159558159558+0.18190638190638198j)
13 Execution time: 0:00:16.800244 ovlp:
(0.9481047481047482+0.19278439278439286j)
14 Execution time: 0:00:16.809994 ovlp:
(0.9399147399147398+0.20365400365400355j)
15 Execution time: 0:00:16.820460 ovlp:
(0.9321615321615322+0.2202776202776202j)
16 Execution time: 0:00:16.831540 ovlp:
(0.9245343245343245+0.2321384321384321j)
17 Execution time: 0:00:16.843369 ovlp:
(0.9152019152019153+0.24241164241164248j)

```

```

18 Execution time: 0:00:16.855959  ovlp:
(0.902005502005502+0.25192885192885184j)
19 Execution time: 0:00:16.869282  ovlp:
(0.8931938931938932+0.26436086436086437j)
20 Execution time: 0:00:16.885275  ovlp:
(0.8823662823662823+0.2777168777168777j)
21 Execution time: 0:00:16.900020  ovlp:
(0.8724122724122725+0.2856968856968858j)
x_points = [np.float64(0.0), np.float64(0.1334322475613052),
np.float64(0.2668644951226104), np.float64(0.4002967426839156),
np.float64(0.5337289902452208), np.float64(0.667161237806526),
np.float64(0.8005934853678311), np.float64(0.9340257329291364),
np.float64(1.0674579804904416), np.float64(1.2008902280517468),
np.float64(1.334322475613052), np.float64(1.4677547231743573),
np.float64(1.6011869707356623), np.float64(1.7346192182969675),
np.float64(1.8680514658582728), np.float64(2.001483713419578),
np.float64(2.134915960980883), np.float64(2.2683482085421884),
np.float64(2.4017804561034937), np.float64(2.535212703664799),
np.float64(2.668644951226104), np.float64(2.8020771987874094)] y_points
= [1.          +0.j
0.9997143997143998+0.0176022176022177j
0.9989163989163989+0.0298914298914299j
0.9972699972699972+0.04722904722904731j
0.9947667947667949+0.06383586383586382j
0.9921459921459921+0.0737898737898739j
0.9884163884163883+0.09275709275709265j
0.9844515844515844+0.10806190806190807j
0.9794787794787794+0.11886431886431881j
0.9749763749763749+0.14077154077154086j
0.9688947688947689+0.15169995169995176j
0.9625107625107625+0.16828156828156837j
0.9558159558159558+0.18190638190638198j
0.9481047481047482+0.19278439278439286j
0.9399147399147398+0.20365400365400355j
0.9321615321615322+0.2202776202776202j
0.9245343245343245+0.2321384321384321j
0.9152019152019153+0.24241164241164248j
0.902005502005502 +0.25192885192885184j
0.8931938931938932+0.26436086436086437j
0.8823662823662823+0.2777168777168777j
0.8724122724122725+0.2856968856968858j ]
fit1: [ 0.3846448568463536 -0.30191207958690913]
[ 0.3846448568463536 -0.30191207958690913  0.3846548567463536
-0.          ] 5.602126936285559e-10
[ 2.8674920956230476e-01 -3.4633394960736819e-01
3.0324951114024590e-01
-5.8655384555943886e-02  2.0462067266051890e-06]

```

```

4.165863301449189e-10
E_gs: -0.3463339496073682
test mps sampling took: (0.001302957534790039, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.0882196387697052
1 Execution time: 0:00:17.292746 ovlp:
(0.9998279999999999+0.01219199999999998j)
2 Execution time: 0:00:17.294779 ovlp:
(0.9994799999999999+0.019511999999999974j)
3 Execution time: 0:00:17.297549 ovlp:
(0.998724+0.029096000000000001j)
4 Execution time: 0:00:17.300932 ovlp:
(0.9976400000000001+0.043379999999999974j)
5 Execution time: 0:00:17.304778 ovlp: (0.99688+0.053992000000000004j)
6 Execution time: 0:00:17.309489 ovlp:
(0.9950000000000001+0.059252000000000008j)
7 Execution time: 0:00:17.314765 ovlp:
(0.9930920000000001+0.07001199999999996j)
8 Execution time: 0:00:17.320597 ovlp:
(0.9910000000000001+0.0823799999999999j)
9 Execution time: 0:00:17.327322 ovlp: (0.989012+0.0918239999999999j)
10 Execution time: 0:00:17.334655 ovlp: (0.986+0.10108399999999995j)
x_points = [np.float64(0.0), np.float64(0.0882196387697052),
np.float64(0.1764392775394104), np.float64(0.26465891630911564),
np.float64(0.3528785550788208), np.float64(0.441098193848526),
np.float64(0.5293178326182313), np.float64(0.6175374713879365),
np.float64(0.7057571101576416), np.float64(0.7939767489273468),
np.float64(0.882196387697052)] y_points = [1.          +0.j
0.9998279999999999+0.01219199999999998j
0.9994799999999999+0.01951199999999997j
0.998724          +0.029096000000000001j
0.9976400000000001+0.04337999999999997j
0.99688          +0.053992000000000004j
0.9950000000000001+0.059252000000000008j
0.9930920000000001+0.07001199999999996j
0.9910000000000001+0.0823799999999999j
0.989012          +0.0918239999999999j
0.986            +0.10108399999999995j]
fit1: [ 0.4442280283089315 -0.2631497619511372]
[ 0.4442280283089315 -0.2631497619511372  0.4442380282089315
 -0.          ] 9.612361913102908e-11
[ 3.3705785209934924e-01 -2.9998576049241032e-01
 3.2739393943956596e-01
 -4.8994932210430352e-02  3.8705379264346526e-06]
9.429413336837126e-11

```

E_gs: -0.2999857604924103
 test mps sampling took: (0.0013020038604736328, Counter({0: 6, 2: 4}))
 truncated ham size: 12 Number of fitting points: 7
 shots per matrix element: 833333.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.03868852224057958
 1 Execution time: 0:00:17.894121 ovlp:
 (0.9999759999904001+0.006502802601121127j)
 2 Execution time: 0:00:17.895912 ovlp:
 (0.99989919995968+0.008878803551521486j)
 3 Execution time: 0:00:17.898388 ovlp:
 (0.9997839999136+0.014108405643362243j)
 4 Execution time: 0:00:17.901573 ovlp:
 (0.9995583998233599+0.016597206638882644j)
 5 Execution time: 0:00:17.905256 ovlp:
 (0.9992655997062398+0.02322360928944378j)
 6 Execution time: 0:00:17.909719 ovlp:
 (0.9990711996284798+0.02554441021776399j)
 x_points = [np.float64(0.0), np.float64(0.03868852224057958),
 np.float64(0.07737704448115916), np.float64(0.11606556672173873),
 np.float64(0.15475408896231832), np.float64(0.1934426112028979),
 np.float64(0.23213113344347747)] y_points = [1. +0.j
 0.9999759999904001+0.00650280260112113j
 0.99989919995968 +0.00887880355152149j
 0.9997839999136 +0.01410840564336224j
 0.9995583998233599+0.01659720663888264j
 0.9992655997062398+0.02322360928944378j
 0.9990711996284798+0.02554441021776399j]
 fit1: [0.1485064790549399 -0.8181978559486944]
 [0.1485064790549399 -0.8181978559486944 0.1485164789549399
 -0.] 6.247813159044981e-11
 [1.2698817685548161e-01 -6.9993975473673509e-01
 1.2696854973947203e-01
 -2.6273827920533166e-01 1.4518265765435409e-06]
 5.5502143594855394e-11
 E_gs: -0.6999397547367351
 test mps sampling took: (0.0012693405151367188, Counter({2: 7, 0: 3}))
 truncated ham size: 12 Number of fitting points: 20
 shots per matrix element: 263157.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.012574556044684982
 1 Execution time: 0:00:18.161805 ovlp: (1-0.0031198106073561105j)
 2 Execution time: 0:00:18.163612 ovlp:
 (0.99999239997416+0.002641008979430426j)
 3 Execution time: 0:00:18.166109 ovlp:
 (0.9999695998966396+0.003621412312801775j)
 4 Execution time: 0:00:18.169397 ovlp:

```

(0.9999467998191194+0.0060534205816300535j)
5 Execution time: 0:00:18.173207 ovlp:
(0.999916399715759+0.009845833475833787j)
6 Execution time: 0:00:18.177618 ovlp:
(0.9999011996640788+0.010803436731684934j)
7 Execution time: 0:00:18.183840 ovlp:
(0.9998555995090384+0.012353842003062887j)
8 Execution time: 0:00:18.190684 ovlp:
(0.9998175993798379+0.01365344642171773j)
9 Execution time: 0:00:18.198122 ovlp:
(0.9997263990697569+0.015568652933420024j)
10 Execution time: 0:00:18.205510 ovlp:
(0.9996883989405565+0.015515452752539405j)
11 Execution time: 0:00:18.213580 ovlp:
(0.9996427987855159+0.016754256964473635j)
12 Execution time: 0:00:18.222293 ovlp:
(0.9996351987596759+0.014823850401091354j)
13 Execution time: 0:00:18.231478 ovlp:
(0.9996275987338357+0.02192987456157347j)
14 Execution time: 0:00:18.241739 ovlp:
(0.9996047986563155+0.02002226807571139j)
15 Execution time: 0:00:18.254159 ovlp:
(0.9992931975968717+0.020250268850914077j)
16 Execution time: 0:00:18.265940 ovlp:
(0.9991715971834305+0.023465079781271214j)
17 Execution time: 0:00:18.279994 ovlp:
(0.9992627974935115+0.024863484535847524j)
18 Execution time: 0:00:18.292924 ovlp:
(0.9991107969767097+0.023161078747667707j)
19 Execution time: 0:00:18.306200 ovlp:
(0.9990195966666287+0.029172699187177242j)
x_points = [np.float64(0.0), np.float64(0.012574556044684982),
np.float64(0.025149112089369964), np.float64(0.03772366813405495),
np.float64(0.05029822417873993), np.float64(0.0628727802234249),
np.float64(0.0754473362681099), np.float64(0.08802189231279488),
np.float64(0.10059644835747986), np.float64(0.11317100440216483),
np.float64(0.1257455604468498), np.float64(0.1383201164915348),
np.float64(0.1508946725362198), np.float64(0.16346922858090476),
np.float64(0.17604378462558976), np.float64(0.18861834067027472),
np.float64(0.2011928967149597), np.float64(0.2137674527596447),
np.float64(0.22634200880432967), np.float64(0.23891656484901466)]
y_points = [1. +0.j
1. -0.00311981060735611j
0.99999239997416 +0.00264100897943043j
0.9999695998966396+0.00362141231280178j
0.9999467998191194+0.00605342058163005j
0.999916399715759 +0.00984583347583379j

```

0.9999011996640788+0.01080343673168493j
 0.9998555995090384+0.01235384200306289j
 0.9998175993798379+0.01365344642171773j
 0.9997263990697569+0.01556865293342002j
 0.9996883989405565+0.0155154527525394j
 0.9996427987855159+0.01675425696447363j
 0.9996351987596759+0.01482385040109135j
 0.9996275987338357+0.02192987456157347j
 0.9996047986563155+0.02002226807571139j
 0.9992931975968717+0.02025026885091408j
 0.9991715971834305+0.02346507978127121j
 0.9992627974935115+0.02486348453584752j
 0.9991107969767097+0.02316107874766771j
 0.9990195966666287+0.02917269918717724j
 fit1: [0.4818722939147709 -0.2409442399604805]
 [0.4818722939147709 -0.2409442399604805 0.4818822938147709
 -0.] 4.031020026334896e-10
 [4.1660376048266151e-01 -2.0826593322599607e-01
 4.1666302852865300e-01
 -7.6073875783642830e-02 1.3527329167531624e-06]
 4.371454216359509e-10
 E_gs: -0.20826593322599607
 test mps sampling took: (0.0013401508331298828, Counter({2: 6, 0: 4}))
 truncated ham size: 12 Number of fitting points: 24
 shots per matrix element: 217391.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.1161126966295321
 1 Execution time: 0:00:18.622970 ovlp:
 (0.9997331996264796+0.013261818566546069j)
 2 Execution time: 0:00:18.625569 ovlp:
 (0.998969598557438+0.025129835181769256j)
 3 Execution time: 0:00:18.628253 ovlp:
 (0.9978379969731959+0.035571849800589694j)
 4 Execution time: 0:00:18.631876 ovlp:
 (0.9964119949767929+0.05713667999135197j)
 5 Execution time: 0:00:18.636718 ovlp:
 (0.993854391396148+0.061221485710079904j)
 6 Execution time: 0:00:18.642697 ovlp:
 (0.9914899880859833+0.08093711331195874j)
 7 Execution time: 0:00:18.649104 ovlp:
 (0.9880767833074966+0.09418513185918465j)
 8 Execution time: 0:00:18.656164 ovlp:
 (0.9838079773311683+0.10671554940176908j)
 9 Execution time: 0:00:18.663072 ovlp:
 (0.9813791739308435+0.12066276892787653j)
 10 Execution time: 0:00:18.671532 ovlp:
 (0.9757579660611524+0.13487678882750442j)

```

11 Execution time: 0:00:18.680879  ovlp:
(0.9720595608833853+0.14620200468280653j)
12 Execution time: 0:00:18.689541  ovlp:
(0.9664383530136942+0.15541121757570453j)
13 Execution time: 0:00:18.699045  ovlp:
(0.961194345672084+0.168898436457811j)
14 Execution time: 0:00:18.709131  ovlp:
(0.95411953576735+0.184722458611442j)
15 Execution time: 0:00:18.719891  ovlp:
(0.9487835282969397+0.19196286874801616j)
16 Execution time: 0:00:18.731414  ovlp:
(0.9401999162798829+0.20573528802940322j)
17 Execution time: 0:00:18.743476  ovlp:
(0.9335667069933897+0.21401529962141952j)
18 Execution time: 0:00:18.756025  ovlp:
(0.9262066966893754+0.22385931340303866j)
19 Execution time: 0:00:18.769469  ovlp:
(0.9164270829979162+0.23268212575497604j)
20 Execution time: 0:00:18.783388  ovlp:
(0.9096098734538229+0.24996894995652985j)
21 Execution time: 0:00:18.797884  ovlp:
(0.9008790612306856+0.2563445588823825j)
22 Execution time: 0:00:18.813227  ovlp:
(0.8894250451950634+0.26759617463464447j)
23 Execution time: 0:00:18.831257  ovlp:
(0.8836750371450519+0.27340138276193593j)
x_points = [np.float64(0.0), np.float64(0.1161126966295321),
np.float64(0.2322253932590642), np.float64(0.34833808988859627),
np.float64(0.4644507865181284), np.float64(0.5805634831476605),
np.float64(0.6966761797771925), np.float64(0.8127888764067247),
np.float64(0.9289015730362568), np.float64(1.045014269665789),
np.float64(1.161126966295321), np.float64(1.277239662924853),
np.float64(1.393352359554385), np.float64(1.5094650561839171),
np.float64(1.6255777528134494), np.float64(1.7416904494429815),
np.float64(1.8578031460725135), np.float64(1.9739158427020456),
np.float64(2.090028539331578), np.float64(2.20614123596111),
np.float64(2.322253932590642), np.float64(2.438366629220174),
np.float64(2.554479325849706), np.float64(2.670592022479238)] y_points =
[1.          +0.j
 0.9997331996264796+0.01326181856654607j
 0.998969598557438 +0.02512983518176926j
 0.9978379969731959+0.03557184980058969j
 0.9964119949767929+0.05713667999135197j
 0.993854391396148 +0.0612214857100799j
 0.9914899880859833+0.08093711331195874j
 0.9880767833074966+0.09418513185918465j
 0.9838079773311683+0.10671554940176908j

```

0.9813791739308435+0.12066276892787653j
 0.9757579660611524+0.13487678882750442j
 0.9720595608833853+0.14620200468280653j
 0.9664383530136942+0.15541121757570453j
 0.961194345672084 +0.168898436457811j
 0.95411953576735 +0.184722458611442j
 0.9487835282969397+0.19196286874801616j
 0.9401999162798829+0.20573528802940322j
 0.9335667069933897+0.21401529962141952j
 0.9262066966893754+0.22385931340303866j
 0.9164270829979162+0.23268212575497604j
 0.9096098734538229+0.24996894995652985j
 0.9008790612306856+0.2563445588823825j
 0.8894250451950634+0.26759617463464447j
 0.8836750371450519+0.27340138276193593j
 fit1: [0.38033411493933045 -0.30397856812337243]
 [0.38033411493933045 -0.30397856812337243 0.38034411483933045
 -0.] 1.3391582495522002e-09
 [2.8513841061166911e-01 -3.4689239362853935e-01
 2.8192466457223375e-01
 -6.2576696594288106e-02 2.6040269679321035e-06]
 1.4109731909309486e-09
 E_gs: -0.34689239362853935
 test mps sampling took: (0.0013210773468017578, Counter({0: 6, 2: 4}))
 truncated ham size: 12 Number of fitting points: 16
 shots per matrix element: 333333.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.037903983057788034
 1 Execution time: 0:00:19.207854 ovlp:
 (0.99996999997+0.005259005259005356j)
 2 Execution time: 0:00:19.209859 ovlp:
 (0.9999039999039998+0.010071010071009967j)
 3 Execution time: 0:00:19.212538 ovlp:
 (0.9997419997419998+0.012615012615012633j)
 4 Execution time: 0:00:19.215721 ovlp:
 (0.9995619995619995+0.017709017709017782j)
 5 Execution time: 0:00:19.219525 ovlp:
 (0.9993759993759994+0.023361023361023303j)
 6 Execution time: 0:00:19.223976 ovlp:
 (0.9991119991119992+0.02989502989502979j)
 7 Execution time: 0:00:19.230128 ovlp:
 (0.9988299988299989+0.02871902871902865j)
 8 Execution time: 0:00:19.236925 ovlp:
 (0.9983139983139984+0.03569703569703564j)
 9 Execution time: 0:00:19.244293 ovlp:
 (0.9981099981099981+0.03932103932103925j)
 10 Execution time: 0:00:19.251754 ovlp:


```

(0.9975399975399974+0.04511704511704506j)
11 Execution time: 0:00:19.259658  ovlp:
(0.9969279969279969+0.0482010482010482j)
12 Execution time: 0:00:19.268243  ovlp:
(0.9963999963999963+0.04996504996504991j)
13 Execution time: 0:00:19.277531  ovlp:
(0.9961359961359961+0.05446505446505445j)
14 Execution time: 0:00:19.287419  ovlp:
(0.9951459951459951+0.061401061401061385j)
15 Execution time: 0:00:19.299694  ovlp:
(0.9944019944019944+0.06665106665106668j)
x_points = [np.float64(0.0), np.float64(0.037903983057788034),
np.float64(0.07580796611557607), np.float64(0.11371194917336411),
np.float64(0.15161593223115213), np.float64(0.18951991528894016),
np.float64(0.22742389834672821), np.float64(0.26532788140451624),
np.float64(0.30323186446230427), np.float64(0.3411358475200923),
np.float64(0.3790398305778803), np.float64(0.41694381363566835),
np.float64(0.45484779669345643), np.float64(0.49275177975124446),
np.float64(0.5306557628090325), np.float64(0.5685597458668205)]
y_points = [1.          +0.j
0.99996999997   +0.00525900525900536j
0.9999039999039998+0.01007101007100997j
0.9997419997419998+0.01261501261501263j
0.9995619995619995+0.01770901770901778j
0.9993759993759994+0.0233610233610233j
0.9991119991119992+0.02989502989502979j
0.9988299988299989+0.02871902871902865j
0.9983139983139984+0.03569703569703564j
0.9981099981099981+0.03932103932103925j
0.9975399975399974+0.04511704511704506j
0.9969279969279969+0.0482010482010482j
0.9963999963999963+0.04996504996504991j
0.9961359961359961+0.05446505446505445j
0.9951459951459951+0.06140106140106139j
0.9944019944019944+0.06665106665106668j]
fit1: [ 0.48394423756228694 -0.24151712367942965]
[ 0.48394423756228694 -0.24151712367942965  0.48395423746228694
 -0.          ] 1.715767391246219e-10
[ 4.0986057572597151e-01 -2.0411940684360999e-01
 4.1034213991865714e-01
 -8.2441977598754740e-02  1.5142558812640903e-06]
2.9545510998515615e-10
E_gs: -0.20411940684361
test mps sampling took: (0.0012884140014648438, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 224 2 qubit gates: 120

```

```

N gate: 224 dt: 0.29117113699879626
1 Execution time: 0:00:19.859679 ovlp:
(0.998408+0.0325439999999999906j)
2 Execution time: 0:00:19.862118 ovlp: (0.994+0.067368000000000001j)
3 Execution time: 0:00:19.865561 ovlp: (0.98668+0.1021760000000000004j)
4 Execution time: 0:00:19.869231 ovlp: (0.975528+0.13378399999999999j)
5 Execution time: 0:00:19.873355 ovlp: (0.962936+0.1674720000000000007j)
6 Execution time: 0:00:19.877969 ovlp:
(0.948352000000000001+0.191759999999999993j)
7 Execution time: 0:00:19.884175 ovlp: (0.930056+0.225464000000000001j)
8 Execution time: 0:00:19.891645 ovlp: (0.9096+0.2489040000000000001j)
9 Execution time: 0:00:19.900286 ovlp: (0.885024+0.275184000000000001j)
10 Execution time: 0:00:19.908767 ovlp:
(0.860880000000000001+0.2931200000000000005j)
11 Execution time: 0:00:19.917861 ovlp:
(0.8371919999999999+0.3148880000000000006j)
12 Execution time: 0:00:19.928464 ovlp:
(0.809384000000000001+0.32674399999999999j)
13 Execution time: 0:00:19.938432 ovlp:
(0.780368+0.3420080000000000001j)
14 Execution time: 0:00:19.948639 ovlp:
(0.7512479999999999+0.35581599999999999j)
15 Execution time: 0:00:19.961025 ovlp:
(0.724024+0.36469599999999999j)
16 Execution time: 0:00:19.972817 ovlp:
(0.695016000000000001+0.368192000000000001j)
17 Execution time: 0:00:19.985230 ovlp:
(0.664968+0.3770400000000000004j)
18 Execution time: 0:00:19.997982 ovlp:
(0.633936+0.377823999999999994j)
19 Execution time: 0:00:20.011161 ovlp: (0.60328+0.376128j)
20 Execution time: 0:00:20.027297 ovlp: (0.579048+0.374536j)
x_points = [np.float64(0.0), np.float64(0.29117113699879626),
np.float64(0.5823422739975925), np.float64(0.8735134109963888),
np.float64(1.164684547995185), np.float64(1.4558556849939812),
np.float64(1.7470268219927776), np.float64(2.038197958991574),
np.float64(2.32936909599037), np.float64(2.6205402329891663),
np.float64(2.9117113699879624), np.float64(3.202882506986759),
np.float64(3.494053643985555), np.float64(3.7852247809843513),
np.float64(4.076395917983148), np.float64(4.367567054981944),
np.float64(4.65873819198074), np.float64(4.949909328979537),
np.float64(5.2410804659783325), np.float64(5.532251602977129),
np.float64(5.823422739975925)] y_points = [1.          +0.j
0.998408      +0.032543999999999991j
0.994         +0.067368000000000001j
0.98668       +0.1021760000000000004j
0.975528      +0.13378399999999999j

```

```

0.962936      +0.167472000000000007j
0.948352000000000001+0.191759999999999993j
0.930056      +0.225464000000000001j
0.9096        +0.248904000000000001j
0.885024      +0.275184000000000001j
0.860880000000000001+0.293120000000000005j
0.8371919999999999+0.314888000000000006j
0.809384000000000001+0.32674399999999999j
0.780368      +0.342008000000000001j
0.7512479999999999+0.35581599999999999j
0.724024      +0.36469599999999999j
0.695016000000000001+0.368192000000000001j
0.664968      +0.377040000000000004j
0.633936      +0.377823999999999994j
0.60328       +0.376128j
0.579048      +0.374536j      ]
fit1: [ 0.38134094969290694 -0.29394555746614626]
[ 0.30042914774707496 -0.33564971828537904  0.37958939826849136
-0.04129069804748871] 2.7089286933162384e-09
[ 0.29555538480940935 -0.337659074949702  0.2833360129536613
-0.05455682176428009 -0.00314353583315635] 2.5594727318439163e-09
E_gs: -0.337659074949702
test mps sampling took: (0.0012979507446289062, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.005961375747227477
1 Execution time: 0:00:20.407502  ovlp: (1+0.0030426030426029538j)
2 Execution time: 0:00:20.409473  ovlp: (1+0.0024926024926024137j)
3 Execution time: 0:00:20.412132  ovlp:
(0.9999955999956001+0.0007590007590008163j)
4 Execution time: 0:00:20.415511  ovlp: (1+0.003997403997404003j)
5 Execution time: 0:00:20.419350  ovlp:
(0.9999735999735999+0.003583803583803613j)
6 Execution time: 0:00:20.423790  ovlp:
(0.9999779999780001+0.006421806421806453j)
7 Execution time: 0:00:20.429085  ovlp:
(0.9999647999648+0.002211002211002233j)
8 Execution time: 0:00:20.434961  ovlp:
(0.9999559999559999+0.00691900691900682j)
9 Execution time: 0:00:20.441684  ovlp:
(0.9999515999516+0.006795806795806714j)
10 Execution time: 0:00:20.448969  ovlp:
(0.9999251999251999+0.005229405229405293j)
11 Execution time: 0:00:20.457010  ovlp:
(0.9999075999075999+0.00815100815100811j)
x_points = [np.float64(0.0), np.float64(0.005961375747227477),

```

```

np.float64(0.011922751494454953), np.float64(0.01788412724168243),
np.float64(0.023845502988909906), np.float64(0.029806878736137382),
np.float64(0.03576825448336486), np.float64(0.041729630230592334),
np.float64(0.04769100597781981), np.float64(0.05365238172504729),
np.float64(0.059613757472274764), np.float64(0.06557513321950224)]
y_points = [1.          +0.j
1.          +0.00304260304260295j
1.          +0.00249260249260241j
0.9999955999956001+0.00075900075900082j
1.          +0.003997403997404j
0.9999735999735999+0.00358380358380361j
0.9999779999780001+0.00642180642180645j
0.9999647999648  +0.00221100221100223j
0.9999559999559999+0.00691900691900682j
0.9999515999516  +0.00679580679580671j
0.9999251999251999+0.00522940522940529j
0.9999075999075999+0.00815100815100811j]
fit1: [ 0.10133757680288802 -1.470826095261303 ]
[ 0.10133757680288802 -1.470826095261303  0.10134757670288802
 -0.          ] 2.419277893850257e-10
[ 9.1578478372907252e-02 -1.3293166212920882e+00
 9.1582080483542883e-02
 -5.4726152736199163e-01  9.6425399956433202e-07]
7.103602158075872e-10
E_gs: -1.3293166212920882
test mps sampling took: (0.00128936767578125, Counter({0: 8, 2: 2}))
truncated ham size: 12 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.263366098478443
1 Execution time: 0:00:20.633227  ovlp:
(0.9986623986623986+0.029653829653829566j)
2 Execution time: 0:00:20.635079  ovlp:
(0.9950851950851951+0.061056661056660966j)
3 Execution time: 0:00:20.637599  ovlp:
(0.9888063888063887+0.09139029139029131j)
4 Execution time: 0:00:20.641447  ovlp:
(0.9804023804023805+0.11868351868351867j)
5 Execution time: 0:00:20.645709  ovlp:
(0.9695607695607695+0.14946594946594938j)
6 Execution time: 0:00:20.651203  ovlp:
(0.955973555973556+0.17518837518837516j)
7 Execution time: 0:00:20.656997  ovlp:
(0.942016742016742+0.19957759957759968j)
8 Execution time: 0:00:20.663002  ovlp:
(0.9239019239019239+0.22679602679602673j)
9 Execution time: 0:00:20.669910  ovlp:

```

```

(0.9059015059015059+0.25227645227645223j)
10 Execution time: 0:00:20.677289 ovlp:
(0.8852566852566852+0.2762828762828762j)
11 Execution time: 0:00:20.685339 ovlp:
(0.8622534622534623+0.294916894916895j)
x_points = [np.float64(0.0), np.float64(0.263366098478443),
np.float64(0.526732196956886), np.float64(0.7900982954353291),
np.float64(1.053464393913772), np.float64(1.316830492392215),
np.float64(1.5801965908706581), np.float64(1.843562689349101),
np.float64(2.106928787827544), np.float64(2.370294886305987),
np.float64(2.63366098478443), np.float64(2.897027083262873)] y_points =
[1.          +0.j
0.9986623986623986+0.02965382965382957j
0.9950851950851951+0.06105666105666097j
0.9888063888063887+0.09139029139029131j
0.9804023804023805+0.11868351868351867j
0.9695607695607695+0.14946594946594938j
0.955973555973556 +0.17518837518837516j
0.942016742016742 +0.19957759957759968j
0.9239019239019239+0.22679602679602673j
0.9059015059015059+0.25227645227645223j
0.8852566852566852+0.2762828762828762j
0.8622534622534623+0.294916894916895j ]
fit1: [ 0.38432508600661675 -0.30106745423612497]
[ 0.38432508600661675 -0.30106745423612497 0.38433508590661675
-0.          ] 6.828169643787167e-11
[ 2.8966195608097101e-01 -3.4445536894316314e-01
2.9994087344993647e-01
-5.7227530811864886e-02 2.5628809099159875e-06]
1.9286637289524202e-10
E_gs: -0.34445536894316314
test mps sampling took: (0.0012865066528320312, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.02624544696837622
1 Execution time: 0:00:21.104141 ovlp:
(0.9999936+0.00422560000000000515j)
2 Execution time: 0:00:21.106028 ovlp:
(0.9999439999999999+0.0084560000000000019j)
3 Execution time: 0:00:21.108641 ovlp:
(0.9998912+0.0099823999999999947j)
4 Execution time: 0:00:21.112556 ovlp:
(0.9997824+0.013228800000000004j)
x_points = [np.float64(0.0), np.float64(0.02624544696837622),
np.float64(0.05249089393675244), np.float64(0.07873634090512867),
np.float64(0.10498178787350489)] y_points = [1.          +0.j

```

```

0.9999936      +0.004225600000000005j
0.9999439999999999+0.008456000000000002j
0.9998912      +0.009982399999999995j
0.9997824      +0.013228800000000004j]
fit1: [ 0.11665020683950414 -1.3425988477215083 ]
[ 0.11665020683950414 -1.3425988477215083  0.11666020673950414
-0.          ] 7.522290115206069e-11
[ 9.9841430885087887e-02 -1.1491388118737986e+00
9.9850709649176528e-02
-4.5537271128246498e-01  1.4407142238408946e-06]
1.0953379182611619e-10
E_gs: -1.1491388118737986
test mps sampling took: (0.0012943744659423828, Counter({2: 7, 0: 3}))
truncated ham size: 12  Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.15080191046321528
1  Execution time: 0:00:21.282645  ovlp:
(0.9995631995631995+0.01821821821821823j)
2  Execution time: 0:00:21.284528  ovlp:
(0.9983203983203983+0.03687063687063685j)
3  Execution time: 0:00:21.288023  ovlp:
(0.9963651963651963+0.05357305357305364j)
4  Execution time: 0:00:21.291701  ovlp:
(0.9938327938327938+0.06617266617266626j)
5  Execution time: 0:00:21.296463  ovlp:
(0.9899067899067899+0.08955708955708963j)
6  Execution time: 0:00:21.301897  ovlp:
(0.9856583856583856+0.10702390702390696j)
7  Execution time: 0:00:21.307358  ovlp:
(0.980947180947181+0.12183352183352181j)
8  Execution time: 0:00:21.313292  ovlp:
(0.9753987753987754+0.13551473551473547j)
9  Execution time: 0:00:21.320330  ovlp:
(0.968097968097968+0.1545311545311545j)
10 Execution time: 0:00:21.328823  ovlp:
(0.9602719602719603+0.1698659698659699j)
11 Execution time: 0:00:21.339149  ovlp:
(0.9524147524147524+0.18251758251758243j)
12 Execution time: 0:00:21.347723  ovlp:
(0.9438607438607438+0.20031720031720024j)
13 Execution time: 0:00:21.357956  ovlp:
(0.9344331344331345+0.21167921167921167j)
x_points = [np.float64(0.0), np.float64(0.15080191046321528),
np.float64(0.30160382092643057), np.float64(0.45240573138964585),
np.float64(0.6032076418528611), np.float64(0.7540095523160764),
np.float64(0.9048114627792917), np.float64(1.055613373242507),

```

```

np.float64(1.2064152837057223), np.float64(1.3572171941689375),
np.float64(1.5080191046321527), np.float64(1.6588210150953682),
np.float64(1.8096229255585834), np.float64(1.9604248360217986)]
y_points = [1.          +0.j
0.9995631995631995+0.01821821821821823j
0.9983203983203983+0.03687063687063685j
0.9963651963651963+0.05357305357305364j
0.9938327938327938+0.06617266617266626j
0.9899067899067899+0.08955708955708963j
0.9856583856583856+0.10702390702390696j
0.980947180947181 +0.12183352183352181j
0.9753987753987754+0.13551473551473547j
0.968097968097968 +0.1545311545311545j
0.9602719602719603+0.1698659698659699j
0.9524147524147524+0.18251758251758243j
0.9438607438607438+0.20031720031720024j
0.9344331344331345+0.21167921167921167j]
fit1: [ 0.38034698176804727 -0.3049610877359848 ]
[ 0.38034698176804727 -0.3049610877359848  0.38035698166804727
 -0.          ] 2.0968972432959135e-10
[ 2.6747949848121777e-01 -3.5533154479146606e-01
 2.9844157698259577e-01
 -7.2135420111867632e-02  4.4967899245828842e-06]
1.8554593736219542e-10
E_gs: -0.35533154479146606
test mps sampling took: (0.0012989044189453125, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2610018921643826
1 Execution time: 0:00:21.771984  ovlp:
(0.9986559986559986+0.028665028665028736j)
2 Execution time: 0:00:21.773888  ovlp:
(0.9951027951027951+0.06258426258426253j)
3 Execution time: 0:00:21.777408  ovlp:
(0.9893403893403894+0.0932946932946932j)
4 Execution time: 0:00:21.781264  ovlp:
(0.9807891807891809+0.12003192003191998j)
5 Execution time: 0:00:21.785668  ovlp:
(0.9708435708435708+0.15137235137235128j)
6 Execution time: 0:00:21.791030  ovlp:
(0.9575127575127576+0.1746151746151745j)
7 Execution time: 0:00:21.796852  ovlp:
(0.9427791427791428+0.20255360255360255j)
8 Execution time: 0:00:21.804102  ovlp:
(0.9264243264243264+0.22710682710682706j)
9 Execution time: 0:00:21.811390  ovlp:

```

```

(0.9078099078099078+0.2473928473928475j)
10 Execution time: 0:00:21.819124 ovlp:
(0.8869190869190868+0.2743568743568743j)
11 Execution time: 0:00:21.827152 ovlp:
(0.8662382662382662+0.29274449274449266j)
12 Execution time: 0:00:21.836890 ovlp:
(0.8442134442134441+0.3097209097209097j)
13 Execution time: 0:00:21.847972 ovlp:
(0.8185682185682186+0.3243873243873243j)
14 Execution time: 0:00:21.859157 ovlp:
(0.792007392007392+0.33954093954093945j)
15 Execution time: 0:00:21.872041 ovlp:
(0.768999768999769+0.3519057519057518j)
16 Execution time: 0:00:21.883876 ovlp:
(0.7420525420525421+0.36053256053256044j)
17 Execution time: 0:00:21.896033 ovlp:
(0.7168945168945169+0.3665133665133664j)
18 Execution time: 0:00:21.910782 ovlp:
(0.689023289023289+0.3726957726957727j)
19 Execution time: 0:00:21.924565 ovlp:
(0.663042063042063+0.3735693735693735j)
20 Execution time: 0:00:21.938882 ovlp:
(0.6378084378084379+0.37711417711417705j)
21 Execution time: 0:00:21.955574 ovlp:
(0.608072408072408+0.375912975912976j)
x_points = [np.float64(0.0), np.float64(0.2610018921643826),
np.float64(0.5220037843287652), np.float64(0.7830056764931477),
np.float64(1.0440075686575303), np.float64(1.305009460821913),
np.float64(1.5660113529862953), np.float64(1.827013245150678),
np.float64(2.0880151373150606), np.float64(2.3490170294794432),
np.float64(2.610018921643826), np.float64(2.8710208138082085),
np.float64(3.1320227059725907), np.float64(3.3930245981369733),
np.float64(3.654026490301356), np.float64(3.9150283824657386),
np.float64(4.176030274630121), np.float64(4.437032166794504),
np.float64(4.6980340589588865), np.float64(4.959035951123269),
np.float64(5.220037843287652), np.float64(5.481039735452034)] y_points =
[1.          +0.j
0.9986559986559986+0.02866502866502874j
0.9951027951027951+0.06258426258426253j
0.9893403893403894+0.0932946932946932j
0.9807891807891809+0.12003192003191998j
0.9708435708435708+0.15137235137235128j
0.9575127575127576+0.1746151746151745j
0.9427791427791428+0.20255360255360255j
0.9264243264243264+0.22710682710682706j
0.9078099078099078+0.2473928473928475j
0.8869190869190868+0.2743568743568743j

```


0.8662382662382662+0.29274449274449266j
0.8442134442134441+0.3097209097209097j
0.8185682185682186+0.3243873243873243j
0.792007392007392 +0.33954093954093945j
0.768999768999769 +0.3519057519057518j
0.7420525420525421+0.36053256053256044j
0.7168945168945169+0.3665133665133664j
0.689023289023289 +0.3726957726957727j
0.663042063042063 +0.3735693735693735j
0.6378084378084379+0.37711417711417705j
0.608072408072408 +0.375912975912976j]
fit1: [0.3806238606324429 -0.29611383923113593]
[0.3055136864298743 -0.33409876349550377 0.3806138365717431
-0.03817721215494803] 4.664632959255732e-10
[0.2912735729773236 -0.34166044494598885 0.28294310207991463
-0.05550239386340195 -0.00448972282435032] 3.184194827979908e-10
E_gs: -0.34166044494598885
test mps sampling took: (0.001312255859375, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.02237767232133782
1 Execution time: 0:00:22.405075 ovlp:
(0.9999807999999999+0.0042880000000000695j)
2 Execution time: 0:00:22.407113 ovlp:
(0.9999743999999999+0.007840000000000007j)
3 Execution time: 0:00:22.409719 ovlp:
(0.9999104000000001+0.0089600000000000079j)
4 Execution time: 0:00:22.413506 ovlp:
(0.9997887999999999+0.012044799999999967j)
5 Execution time: 0:00:22.417812 ovlp:
(0.9998271999999999+0.0093376000000000057j)
6 Execution time: 0:00:22.423255 ovlp:
(0.9995904+0.0171584000000000018j)
7 Execution time: 0:00:22.429108 ovlp:
(0.9996544+0.017580799999999952j)
8 Execution time: 0:00:22.435237 ovlp:
(0.9994240000000001+0.020166399999999918j)
9 Execution time: 0:00:22.441984 ovlp:
(0.9992703999999999+0.02506239999999993j)
10 Execution time: 0:00:22.449434 ovlp:
(0.9992000000000001+0.023743999999999987j)
11 Execution time: 0:00:22.458413 ovlp:
(0.9986496+0.03014399999999995j)
12 Execution time: 0:00:22.468540 ovlp:
(0.9987328+0.029708800000000009j)
13 Execution time: 0:00:22.480376 ovlp:

```

(0.998624+0.035699200000000004j)
14 Execution time: 0:00:22.491655 ovlp:
(0.9982527999999999+0.0352448000000000076j)
15 Execution time: 0:00:22.504337 ovlp:
(0.99811200000000001+0.039494399999999993j)
16 Execution time: 0:00:22.516113 ovlp:
(0.9978111999999999+0.0415296000000000055j)
x_points = [np.float64(0.0), np.float64(0.02237767232133782),
np.float64(0.04475534464267564), np.float64(0.06713301696401346),
np.float64(0.08951068928535127), np.float64(0.1118883616066891),
np.float64(0.1342660339280269), np.float64(0.15664370624936474),
np.float64(0.17902137857070255), np.float64(0.20139905089204035),
np.float64(0.2237767232133782), np.float64(0.24615439553471602),
np.float64(0.2685320678560538), np.float64(0.29090974017739163),
np.float64(0.3132874124987295), np.float64(0.3356650848200673),
np.float64(0.3580427571414051)] y_points = [1.          +0.j
0.9999807999999999+0.004288000000000007j
0.9999743999999999+0.007840000000000007j
0.99991040000000001+0.008960000000000008j
0.9997887999999999+0.012044799999999997j
0.9998271999999999+0.009337600000000006j
0.9995904          +0.017158400000000002j
0.9996544          +0.017580799999999995j
0.99942400000000001+0.020166399999999992j
0.9992703999999999+0.025062399999999993j
0.99920000000000001+0.02374399999999999j
0.9986496          +0.030143999999999995j
0.9987328          +0.029708800000000009j
0.998624          +0.035699200000000004j
0.9982527999999999+0.035244800000000008j
0.99811200000000001+0.039494399999999993j
0.9978111999999999+0.041529600000000006j]
fit1: [ 0.20214036395342955 -0.572994368768822 ]
[ 0.20214036395342955 -0.572994368768822  0.20215036385342955
-0.          ] 1.9821633567147257e-10
[ 1.7172224685480869e-01 -4.8922249724805528e-01
1.7116654187760175e-01
-1.9331216255634984e-01 1.5565597198329884e-06]
1.684954451983113e-10
E_gs: -0.4892224972480553
test mps sampling took: (0.0012629032135009766, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.10460440342096036
1 Execution time: 0:00:23.007378 ovlp:
(0.9997887993241579+0.016368052377767617j)

```

```
2 Execution time: 0:00:23.009351 ovlp:
(0.9993751980006336+0.02118166778133701j)
3 Execution time: 0:00:23.011996 ovlp:
(0.998248794396142+0.036388116441972596j)
4 Execution time: 0:00:23.015825 ovlp:
(0.9968759900031681+0.04950895842866698j)
5 Execution time: 0:00:23.020081 ovlp:
(0.9952215847090711+0.05877538808124183j)
6 Execution time: 0:00:23.025555 ovlp:
(0.9928895772466473+0.07228343130698023j)
7 Execution time: 0:00:23.031743 ovlp:
(0.9901615685170193+0.08377626808405791j)
8 Execution time: 0:00:23.038744 ovlp:
(0.9872223591115492+0.09695871026787284j)
9 Execution time: 0:00:23.046292 ovlp:
(0.9842567496215988+0.10794994543982539j)
10 Execution time: 0:00:23.054642 ovlp:
(0.980375937202999+0.12036678517371246j)
11 Execution time: 0:00:23.063423 ovlp:
(0.9769439262205639+0.1341300292160934j)
12 Execution time: 0:00:23.072403 ovlp:
(0.9717871097187512+0.13831884262029637j)
13 Execution time: 0:00:23.081954 ovlp:
(0.9677654968495899+0.15410609313949797j)
14 Execution time: 0:00:23.093844 ovlp:
(0.9630222816713014+0.1647365271568868j)
15 Execution time: 0:00:23.107226 ovlp:
(0.9581646661269316+0.17869337181878975j)
16 Execution time: 0:00:23.121098 ovlp:
(0.9520750466401493+0.1883998028793692j)
17 Execution time: 0:00:23.134925 ovlp:
(0.9459502270407265+0.1934070189024606j)
18 Execution time: 0:00:23.150522 ovlp:
(0.9387694040620931+0.2051374564398607j)
19 Execution time: 0:00:23.165976 ovlp:
(0.9334629870815587+0.2166038931324581j)
20 Execution time: 0:00:23.181253 ovlp:
(0.9257101622725192+0.22984793551339355j)
21 Execution time: 0:00:23.196093 ovlp:
(0.9182477383927627+0.23790876130803618j)
22 Execution time: 0:00:23.213775 ovlp:
(0.9110669154141293+0.2471135907634905j)
x_points = [np.float64(0.0), np.float64(0.10460440342096036),
np.float64(0.20920880684192072), np.float64(0.3138132102628811),
np.float64(0.41841761368384145), np.float64(0.5230220171048018),
np.float64(0.6276264205257622), np.float64(0.7322308239467226),
np.float64(0.8368352273676829), np.float64(0.9414396307886432),
```

```

np.float64(1.0460440342096036), np.float64(1.150648437630564),
np.float64(1.2552528410515245), np.float64(1.3598572444724848),
np.float64(1.4644616478934451), np.float64(1.5690660513144055),
np.float64(1.6736704547353658), np.float64(1.7782748581563261),
np.float64(1.8828792615772865), np.float64(1.9874836649982468),
np.float64(2.092088068419207), np.float64(2.1966924718401675),
np.float64(2.301296875261128)] y_points = [1.          +0.j
0.9997887993241579+0.01636805237776762j
0.9993751980006336+0.02118166778133701j
0.998248794396142 +0.0363881164419726j
0.9968759900031681+0.04950895842866698j
0.9952215847090711+0.05877538808124183j
0.9928895772466473+0.07228343130698023j
0.9901615685170193+0.08377626808405791j
0.9872223591115492+0.09695871026787284j
0.9842567496215988+0.10794994543982539j
0.980375937202999 +0.12036678517371246j
0.9769439262205639+0.1341300292160934j
0.9717871097187512+0.13831884262029637j
0.9677654968495899+0.15410609313949797j
0.9630222816713014+0.1647365271568868j
0.9581646661269316+0.17869337181878975j
0.9520750466401493+0.1883998028793692j
0.9459502270407265+0.1934070189024606j
0.9387694040620931+0.2051374564398607j
0.9334629870815587+0.2166038931324581j
0.9257101622725192+0.22984793551339355j
0.9182477383927627+0.23790876130803618j
0.9110669154141293+0.2471135907634905j ]
fit1: [ 0.38440414541582496 -0.30217099308061174]
[ 0.38440414541582496 -0.30217099308061174  0.38441414531582496
-0.          ] 5.709714647178597e-10
[ 2.8484337380640645e-01 -3.4753583001704441e-01
2.9786811354095422e-01
-5.9841373595041131e-02  4.2004008673049127e-06]
6.349293113353242e-10
E_gs: -0.3475358300170444
test mps sampling took: (0.001359701156616211, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.026328897984067835
1 Execution time: 0:00:23.631005 ovlp:
(0.9999936+0.004435200000000000835j)
2 Execution time: 0:00:23.632918 ovlp:
(0.999968+0.00784640000000000031j)
3 Execution time: 0:00:23.635485 ovlp:

```

```

(0.9998848+0.0091391999999999903j)
4 Execution time: 0:00:23.638664 ovlp:
(0.9997567999999999+0.0101632000000000039j)
5 Execution time: 0:00:23.642547 ovlp:
(0.99960960000000001+0.014111999999999902j)
6 Execution time: 0:00:23.647152 ovlp:
(0.9995136+0.0179647999999999892j)
7 Execution time: 0:00:23.652399 ovlp:
(0.9994432+0.020153599999999994j)
8 Execution time: 0:00:23.659332 ovlp:
(0.99916160000000001+0.0250303999999999897j)
9 Execution time: 0:00:23.667118 ovlp:
(0.9989311999999999+0.0257920000000000037j)
10 Execution time: 0:00:23.674786 ovlp:
(0.99882240000000001+0.031564799999999995j)
11 Execution time: 0:00:23.683810 ovlp:
(0.99841920000000001+0.033542399999999997j)
12 Execution time: 0:00:23.694098 ovlp:
(0.9983679999999999+0.0363903999999999934j)
13 Execution time: 0:00:23.703447 ovlp:
(0.9981055999999999+0.042643200000000001j)
14 Execution time: 0:00:23.713560 ovlp:
(0.997312+0.0413376000000000085j)
15 Execution time: 0:00:23.724293 ovlp:
(0.9972992+0.048019199999999993j)
16 Execution time: 0:00:23.735627 ovlp:
(0.9969471999999999+0.051084799999999993j)
x_points = [np.float64(0.0), np.float64(0.026328897984067835),
np.float64(0.05265779596813567), np.float64(0.07898669395220351),
np.float64(0.10531559193627134), np.float64(0.13164448992033917),
np.float64(0.15797338790440701), np.float64(0.18430228588847483),
np.float64(0.21063118387254268), np.float64(0.23696008185661052),
np.float64(0.26328897984067834), np.float64(0.2896178778247462),
np.float64(0.31594677580881403), np.float64(0.3422756737928819),
np.float64(0.36860457177694966), np.float64(0.3949334697610175),
np.float64(0.42126236774508535)] y_points = [1.          +0.j
0.9999936      +0.0044352000000000008j
0.999968       +0.0078464000000000003j
0.9998848      +0.009139199999999999j
0.9997567999999999+0.0101632000000000004j
0.99960960000000001+0.014111999999999999j
0.9995136      +0.017964799999999989j
0.9994432      +0.020153599999999999j
0.99916160000000001+0.025030399999999999j
0.9989311999999999+0.0257920000000000004j
0.99882240000000001+0.031564799999999995j
0.99841920000000001+0.033542399999999997j

```

0.9983679999999999+0.03639039999999993j
0.9981055999999999+0.04264320000000001j
0.997312 +0.041337600000000009j
0.9972992 +0.04801919999999993j
0.9969471999999999+0.05108479999999993j]
fit1: [0.48686427668191135 -0.24327928133938806]
[0.48686427668191135 -0.24327928133938806 0.48687427658191135
-0.] 7.024061141756911e-11
[4.2085679102175927e-01 -2.0985052387360381e-01
4.2139089769392168e-01
-7.4317675850998091e-02 1.3389126869404034e-06]
1.0961995035426358e-10
E_gs: -0.2098505238736038
test mps sampling took: (0.0012538433074951172, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.00795890571434741
1 Execution time: 0:00:24.250295 ovlp: (1-0.0006104014649634948j)
2 Execution time: 0:00:24.252205 ovlp:
(0.9999943999865599+0.0015736037766491684j)
3 Execution time: 0:00:24.254753 ovlp:
(0.9999943999865599+0.004071209770903472j)
4 Execution time: 0:00:24.258054 ovlp:
(0.99998319995968+0.0024360058464141243j)
5 Execution time: 0:00:24.261903 ovlp:
(0.9999663999193598+0.004093609824663558j)
6 Execution time: 0:00:24.266395 ovlp:
(0.9999719999327998+0.0053480128352307865j)
7 Execution time: 0:00:24.271709 ovlp:
(0.9999383998521596+0.0065072156173173745j)
8 Execution time: 0:00:24.277609 ovlp:
(0.9999383998521596+0.004642411141786651j)
9 Execution time: 0:00:24.285394 ovlp:
(0.9999271998252797+0.0052640126336302995j)
10 Execution time: 0:00:24.294013 ovlp:
(0.9998655996774393+0.006904816571559724j)
11 Execution time: 0:00:24.302044 ovlp:
(0.9998599996639992+0.009648823157175634j)
12 Execution time: 0:00:24.310679 ovlp:
(0.9998823997177593+0.010119224286138317j)
13 Execution time: 0:00:24.319817 ovlp:
(0.999815199556479+0.00995682389637742j)
14 Execution time: 0:00:24.329797 ovlp:
(0.999831999596799+0.010085624205498078j)
x_points = [np.float64(0.0), np.float64(0.00795890571434741),
np.float64(0.01591781142869482), np.float64(0.02387671714304223),

```

np.float64(0.03183562285738964), np.float64(0.03979452857173705),
np.float64(0.04775343428608446), np.float64(0.05571234000043187),
np.float64(0.06367124571477928), np.float64(0.07163015142912668),
np.float64(0.0795890571434741), np.float64(0.08754796285782152),
np.float64(0.09550686857216892), np.float64(0.10346577428651632),
np.float64(0.11142468000086374)] y_points = [1.          +0.j
1.          -0.00061040146496349j
0.9999943999865599+0.00157360377664917j
0.9999943999865599+0.00407120977090347j
0.99998319995968 +0.00243600584641412j
0.9999663999193598+0.00409360982466356j
0.9999719999327998+0.00534801283523079j
0.9999383998521596+0.00650721561731737j
0.9999383998521596+0.00464241114178665j
0.9999271998252797+0.0052640126336303j
0.9998655996774393+0.00690481657155972j
0.9998599996639992+0.00964882315717563j
0.9998823997177593+0.01011922428613832j
0.999815199556479 +0.00995682389637742j
0.999831999596799 +0.01008562420549808j]
fit1: [ 0.06293944817073228 -1.811714789788147 ]
[ 0.06293944817073228 -1.811714789788147  0.06294944807073229
-0.          ] 1.151336979454944e-10
[ 5.4263691227496066e-02 -1.5632989112911562e+00
5.4243130607606119e-02
-5.6762683709026707e-01  1.3875057479665440e-06]
1.3131226995567606e-10
E_gs: -1.5632989112911562
test mps sampling took: (0.0012764930725097656, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.03584590568359954
1 Execution time: 0:00:24.530166 ovlp:
(0.99998559997696+0.00431520690433107j)
2 Execution time: 0:00:24.532594 ovlp:
(0.9999471999155198+0.005371208593933696j)
3 Execution time: 0:00:24.535458 ovlp:
(0.9997935996697596+0.01022401635842618j)
4 Execution time: 0:00:24.539009 ovlp:
(0.9996879995007992+0.016080025728041125j)
5 Execution time: 0:00:24.543088 ovlp:
(0.9994575991321586+0.023044836871739083j)
6 Execution time: 0:00:24.547632 ovlp:
(0.9991647986636778+0.026592042547268102j)
7 Execution time: 0:00:24.552868 ovlp:
(0.9988143981030371+0.03042724868359792j)

```

```

8 Execution time: 0:00:24.558771 ovlp:
(0.9985935977497564+0.03385925417480662j)
9 Execution time: 0:00:24.565395 ovlp:
(0.9981279970047952+0.036460858337373336j)
10 Execution time: 0:00:24.572774 ovlp:
(0.9976767962828741+0.04227366763786833j)
11 Execution time: 0:00:24.582144 ovlp:
(0.997263995622393+0.045729673167477j)
12 Execution time: 0:00:24.591907 ovlp:
(0.9967215947545516+0.05034728055564885j)
x_points = [np.float64(0.0), np.float64(0.03584590568359954),
np.float64(0.07169181136719908), np.float64(0.10753771705079862),
np.float64(0.14338362273439817), np.float64(0.17922952841799772),
np.float64(0.21507543410159724), np.float64(0.2509213397851968),
np.float64(0.28676724546879634), np.float64(0.32261315115239586),
np.float64(0.35845905683599544), np.float64(0.39430496251959496),
np.float64(0.4301508682031945)] y_points = [1.          +0.j
0.99998559997696 +0.00431520690433107j
0.9999471999155198+0.0053712085939337j
0.9997935996697596+0.01022401635842618j
0.9996879995007992+0.01608002572804113j
0.9994575991321586+0.02304483687173908j
0.9991647986636778+0.0265920425472681j
0.9988143981030371+0.03042724868359792j
0.9985935977497564+0.03385925417480662j
0.9981279970047952+0.03646085833737334j
0.9976767962828741+0.04227366763786833j
0.997263995622393 +0.045729673167477j
0.9967215947545516+0.05034728055564885j]
fit1: [ 0.48892101346348293 -0.2440820095827636 ]
[ 0.48892101346348293 -0.2440820095827636  0.48893101336348294
-0.          ] 9.022398659899616e-11
[ 4.1830742052915831e-01 -2.0856557272980852e-01
4.1861698207803544e-01
-7.9222680439182250e-02 1.4344189549597768e-06]
1.244859676382266e-10
E_gs: -0.20856557272980852
test mps sampling took: (0.0012946128845214844, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.017554709887303815
1 Execution time: 0:00:25.236518 ovlp: (1+0.003995212784680957j)
2 Execution time: 0:00:25.238412 ovlp:
(0.9999911999718398+0.004197613432362912j)
3 Execution time: 0:00:25.241125 ovlp:
(0.9999207997465591+0.005746418388538954j)

```


4 Execution time: 0:00:25.244375 ovlp:
(0.9999383998028795+0.007876025203280568j)
5 Execution time: 0:00:25.248185 ovlp:
(0.9998767996057587+0.009521630469217612j)
6 Execution time: 0:00:25.252631 ovlp:
(0.9997623992396776+0.012592840297088959j)
7 Execution time: 0:00:25.257808 ovlp:
(0.999709599070717+0.00958323066633815j)
8 Execution time: 0:00:25.263763 ovlp:
(0.9996743989580767+0.01833925868562769j)
9 Execution time: 0:00:25.270535 ovlp:
(0.9996215987891162+0.018920060544193706j)
10 Execution time: 0:00:25.277889 ovlp:
(0.9995511985638355+0.021551268964060677j)
11 Execution time: 0:00:25.285872 ovlp:
(0.9994015980851139+0.02048646555668987j)
12 Execution time: 0:00:25.294402 ovlp:
(0.9990759970431906+0.02280087296279354j)
13 Execution time: 0:00:25.303853 ovlp:
(0.9989967967897497+0.024613678763772073j)
14 Execution time: 0:00:25.313943 ovlp:
(0.9987855961139076+0.027772888873244472j)
15 Execution time: 0:00:25.326477 ovlp:
(0.9987591960294273+0.0324545038544124j)
16 Execution time: 0:00:25.338095 ovlp:
(0.9986271956070258+0.03239290365729164j)
17 Execution time: 0:00:25.350208 ovlp:
(0.998345594705903+0.03078249850399528j)
18 Execution time: 0:00:25.362962 ovlp:
(0.9981695941427013+0.03486571157027707j)
19 Execution time: 0:00:25.376262 ovlp:
(0.9982223943116617+0.039740927170967j)
20 Execution time: 0:00:25.390451 ovlp:
(0.9977031926502165+0.04232813545003333j)
21 Execution time: 0:00:25.404970 ovlp:
(0.9975711922278152+0.043815340209088616j)
22 Execution time: 0:00:25.420295 ovlp:
(0.9975711922278152+0.045601745925586856j)
x_points = [np.float64(0.0), np.float64(0.017554709887303815),
np.float64(0.03510941977460763), np.float64(0.052664129661911446),
np.float64(0.07021883954921526), np.float64(0.08777354943651908),
np.float64(0.10532825932382289), np.float64(0.12288296921112671),
np.float64(0.14043767909843052), np.float64(0.15799238898573434),
np.float64(0.17554709887303815), np.float64(0.19310180876034197),
np.float64(0.21065651864764579), np.float64(0.2282112285349496),
np.float64(0.24576593842225342), np.float64(0.26332064830955726),
np.float64(0.28087535819686105), np.float64(0.29843006808416483),

```

np.float64(0.3159847779714687), np.float64(0.3335394878587725),
np.float64(0.3510941977460763), np.float64(0.3686489076333801),
np.float64(0.38620361752068394)] y_points = [1.          +0.j
1.          +0.00399521278468096j
0.9999911999718398+0.00419761343236291j
0.9999207997465591+0.00574641838853895j
0.9999383998028795+0.00787602520328057j
0.9998767996057587+0.00952163046921761j
0.9997623992396776+0.01259284029708896j
0.999709599070717 +0.00958323066633815j
0.9996743989580767+0.01833925868562769j
0.9996215987891162+0.01892006054419371j
0.9995511985638355+0.02155126896406068j
0.9994015980851139+0.02048646555668987j
0.9990759970431906+0.02280087296279354j
0.9989967967897497+0.02461367876377207j
0.9987855961139076+0.02777288887324447j
0.9987591960294273+0.0324545038544124j
0.9986271956070258+0.03239290365729164j
0.998345594705903 +0.03078249850399528j
0.9981695941427013+0.03486571157027707j
0.9982223943116617+0.039740927170967j
0.9977031926502165+0.04232813545003333j
0.9975711922278152+0.04381534020908862j
0.9975711922278152+0.04560174592558686j]
fit1: [ 0.4684245438043412 -0.24339052165411046]
[ 0.4684245438043412 -0.24339052165411046  0.4684345437043412
-0.          ] 3.312095941888617e-10
[ 4.0099464986977301e-01 -2.0774029656303220e-01
4.0168517307224938e-01
-7.4998345779600864e-02  1.4161939570405537e-06]
3.5133478886947716e-10
E_gs: -0.2077402965630322
test mps sampling took: (0.0013308525085449219, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.04984465094665738
1 Execution time: 0:00:25.921965 ovlp:
(0.9999392+0.00365440000000000576j)
2 Execution time: 0:00:25.924507 ovlp:
(0.9997984+0.0124576000000000069j)
3 Execution time: 0:00:25.927847 ovlp:
(0.9996288+0.016022399999999992j)
4 Execution time: 0:00:25.931574 ovlp:
(0.9993376+0.023657599999999945j)
5 Execution time: 0:00:25.936199 ovlp:

```

```

(0.9989408+0.028732800000000003j)
6 Execution time: 0:00:25.941414 ovlp:
(0.9983232+0.034143999999999995j)
7 Execution time: 0:00:25.947758 ovlp:
(0.99781760000000001+0.04062079999999999j)
8 Execution time: 0:00:25.954640 ovlp:
(0.99722559999999999+0.04345599999999994j)
x_points = [np.float64(0.0), np.float64(0.04984465094665738),
np.float64(0.09968930189331476), np.float64(0.14953395283997215),
np.float64(0.19937860378662953), np.float64(0.2492232547332869),
np.float64(0.2990679056799443), np.float64(0.3489125566266017),
np.float64(0.39875720757325905)] y_points = [1.          +0.j
0.9999392      +0.003654400000000006j
0.9997984      +0.012457600000000007j
0.9996288      +0.016022399999999999j
0.9993376      +0.023657599999999995j
0.9989408      +0.0287328j
0.9983232      +0.034143999999999995j
0.99781760000000001+0.04062079999999999j
0.99722559999999999+0.04345599999999994j]
fit1: [ 0.2795489170327519 -0.4196632397160692]
[ 0.2795489170327519 -0.4196632397160692  0.2795589169327519
 -0.          ] 7.496709122894383e-11
[ 2.3819300491573128e-01 -3.5768036080421478e-01
 2.3818245231491936e-01
 -1.3000262377748353e-01  1.4796422411564900e-06]
4.0726394912631585e-11
E_gs: -0.3576803608042148
test mps sampling took: (0.001276254653930664, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.0667382243184056
1 Execution time: 0:00:26.453943 ovlp:
(0.9999171998840799+0.005322207451090355j)
2 Execution time: 0:00:26.455835 ovlp:
(0.9996963995749595+0.019168226835517554j)
3 Execution time: 0:00:26.458972 ovlp:
(0.999438799214319+0.022581431614004277j)
4 Execution time: 0:00:26.462426 ovlp:
(0.9986015980422374+0.03165264431370196j)
5 Execution time: 0:00:26.466816 ovlp:
(0.997957597140636+0.040788257103560044j)
6 Execution time: 0:00:26.471456 ovlp:
(0.9971387959943143+0.04287666002732404j)
7 Execution time: 0:00:26.477659 ovlp:
(0.9960531944744722+0.04835066769093466j)

```

```

8 Execution time: 0:00:26.484550  ovlp:
(0.9951055931478303+0.057348280287592424j)
9 Execution time: 0:00:26.491942  ovlp:
(0.9934955908938272+0.07234430128202174j)
10 Execution time: 0:00:26.499428  ovlp:
(0.992317989245185+0.07860951005331418j)
11 Execution time: 0:00:26.508794  ovlp:
(0.9903491864888612+0.08905152467213462j)
12 Execution time: 0:00:26.517536  ovlp:
(0.9886379840931778+0.09382633135686391j)
13 Execution time: 0:00:26.526934  ovlp:
(0.9872487821482949+0.10064354090095717j)
14 Execution time: 0:00:26.537021  ovlp:
(0.9848383787737303+0.10627394878352825j)
15 Execution time: 0:00:26.548700  ovlp:
(0.9819403747165245+0.11426875997626396j)
16 Execution time: 0:00:26.561566  ovlp:
(0.9792171709040394+0.12025796836115576j)
17 Execution time: 0:00:26.575706  ovlp:
(0.9774691684568357+0.12777437888413035j)
18 Execution time: 0:00:26.590195  ovlp:
(0.9745619643867502+0.13830839363175107j)
19 Execution time: 0:00:26.605046  ovlp:
(0.9724919614887462+0.14277039987855988j)
20 Execution time: 0:00:26.620918  ovlp:
(0.9693455570837799+0.1521728130419382j)
21 Execution time: 0:00:26.636231  ovlp:
(0.9665303531424945+0.15890722247011135j)
22 Execution time: 0:00:26.653798  ovlp:
(0.9631723484412877+0.16497923097092326j)
23 Execution time: 0:00:26.670295  ovlp:
(0.9592255429157601+0.16774843484780888j)
x_points = [np.float64(0.0), np.float64(0.0667382243184056),
np.float64(0.1334764486368112), np.float64(0.20021467295521683),
np.float64(0.2669528972736224), np.float64(0.333691121592028),
np.float64(0.40042934591043366), np.float64(0.46716757022883926),
np.float64(0.5339057945472448), np.float64(0.6006440188656504),
np.float64(0.667382243184056), np.float64(0.7341204675024616),
np.float64(0.8008586918208673), np.float64(0.8675969161392729),
np.float64(0.9343351404576785), np.float64(1.001073364776084),
np.float64(1.0678115890944897), np.float64(1.1345498134128953),
np.float64(1.2012880377313009), np.float64(1.2680262620497065),
np.float64(1.334764486368112), np.float64(1.4015027106865177),
np.float64(1.4682409350049233), np.float64(1.5349791593233288)]
y_points = [1.          +0.j
0.9999171998840799+0.00532220745109035j
0.9996963995749595+0.01916822683551755j

```

0.999438799214319 +0.02258143161400428j
 0.9986015980422374+0.03165264431370196j
 0.997957597140636 +0.04078825710356004j
 0.9971387959943143+0.04287666002732404j
 0.9960531944744722+0.04835066769093466j
 0.9951055931478303+0.05734828028759242j
 0.9934955908938272+0.07234430128202174j
 0.992317989245185 +0.07860951005331418j
 0.9903491864888612+0.08905152467213462j
 0.9886379840931778+0.09382633135686391j
 0.9872487821482949+0.10064354090095717j
 0.9848383787737303+0.10627394878352825j
 0.9819403747165245+0.11426875997626396j
 0.9792171709040394+0.12025796836115576j
 0.9774691684568357+0.12777437888413035j
 0.9745619643867502+0.13830839363175107j
 0.9724919614887462+0.14277039987855988j
 0.9693455570837799+0.1521728130419382j
 0.9665303531424945+0.15890722247011135j
 0.9631723484412877+0.16497923097092326j
 0.9592255429157601+0.16774843484780888j]
 fit1: [0.3781813938375166 -0.3060321096595625]
 [0.3781813938375166 -0.3060321096595625 0.3781913937375166
 -0.] 1.2505037038671417e-09
 [2.7280181724766850e-01 -3.5336666744408346e-01
 2.9179593320429104e-01
 -6.7006449380954250e-02 4.9103668954648368e-06]
 1.2490696026424479e-09
 E_gs: -0.35336666744408346
 test mps sampling took: (0.0013527870178222656, Counter({0: 6, 2: 4}))
 truncated ham size: 12 Number of fitting points: 10
 shots per matrix element: 55555.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.20185370773982267
 1 Execution time: 0:00:27.155096 ovlp:
 (0.9993483993483994+0.023041823041823006j)
 2 Execution time: 0:00:27.157014 ovlp:
 (0.9971559971559971+0.04682704682704686j)
 3 Execution time: 0:00:27.159608 ovlp:
 (0.9935019935019935+0.07091107091107096j)
 4 Execution time: 0:00:27.162926 ovlp:
 (0.9885339885339886+0.0949014949014948j)
 5 Execution time: 0:00:27.166778 ovlp:
 (0.9816795816795816+0.11564471564471557j)
 6 Execution time: 0:00:27.171335 ovlp:
 (0.9744939744939745+0.13971793971793978j)
 7 Execution time: 0:00:27.176853 ovlp:

```

(0.9652095652095651+0.16044316044316043j)
8 Execution time: 0:00:27.182803  ovlp:
(0.9549531549531549+0.18034758034758025j)
9 Execution time: 0:00:27.189353  ovlp:
(0.9431991431991431+0.1979767979767979j)
x_points = [np.float64(0.0), np.float64(0.20185370773982267),
np.float64(0.40370741547964534), np.float64(0.605561123219468),
np.float64(0.8074148309592907), np.float64(1.0092685386991134),
np.float64(1.211122246438936), np.float64(1.4129759541787588),
np.float64(1.6148296619185813), np.float64(1.816683369658404)] y_points =
[1.          +0.j
0.9993483993483994+0.02304182304182301j
0.9971559971559971+0.04682704682704686j
0.9935019935019935+0.07091107091107096j
0.9885339885339886+0.0949014949014948j
0.9816795816795816+0.11564471564471557j
0.9744939744939745+0.13971793971793978j
0.9652095652095651+0.16044316044316043j
0.9549531549531549+0.18034758034758025j
0.9431991431991431+0.1979767979767979j ]
fit1: [ 0.388323394326371 -0.29859262545886484]
[ 0.388323394326371 -0.29859262545886484 0.388333394226371
-0.          ] 5.853478136692759e-11
[ 2.6620483801887351e-01 -3.5676650096894086e-01
3.0335002243318737e-01
-7.1951425126939153e-02 3.5367143157697267e-06]
2.39096105260688e-11
E_gs: -0.35676650096894086
test mps sampling took: (0.0012540817260742188, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.24680958460552127
1 Execution time: 0:00:27.747279  ovlp:
(0.998919198919199+0.029379029379029475j)
2 Execution time: 0:00:27.749230  ovlp:
(0.9955899955899956+0.05553665553665543j)
3 Execution time: 0:00:27.751893  ovlp:
(0.9904995904995906+0.08506828506828512j)
4 Execution time: 0:00:27.755269  ovlp:
(0.982964782964783+0.11329511329511321j)
5 Execution time: 0:00:27.759117  ovlp:
(0.9731143731143732+0.1411075411075411j)
6 Execution time: 0:00:27.763664  ovlp:
(0.9617211617211616+0.1673995673995674j)
7 Execution time: 0:00:27.769804  ovlp:
(0.9486815486815487+0.19054439054439065j)

```

```

x_points = [np.float64(0.0), np.float64(0.24680958460552127),
np.float64(0.49361916921104254), np.float64(0.7404287538165638),
np.float64(0.9872383384220851), np.float64(1.2340479230276062),
np.float64(1.4808575076331276), np.float64(1.727667092238649)] y_points
= [1.          +0.j
0.998919198919199 +0.02937902937902948j
0.9955899955899956+0.05553665553665543j
0.9904995904995906+0.08506828506828512j
0.982964782964783 +0.11329511329511321j
0.9731143731143732+0.1411075411075411j
0.9617211617211616+0.1673995673995674j
0.9486815486815487+0.19054439054439065j]
fit1: [ 0.390169916095985  -0.29736984107616676]
[ 0.390169916095985  -0.29736984107616676  0.390179915995985
 -0.          ] 1.0602929953014809e-11
[ 2.9245181750369692e-01 -3.3898737331085532e-01
 3.0550280210637165e-01
 -5.6862925764871806e-02  3.8935275766857877e-06]
1.1466278367838407e-11
E_gs: -0.3389873733108553
test mps sampling took: (0.0013053417205810547, Counter({0: 8, 2: 2}))
truncated ham size: 12 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.024834728124476704
1 Execution time: 0:00:28.324515 ovlp:
(0.9999823999436799+0.0020592065894611267j)
2 Execution time: 0:00:28.326368 ovlp:
(0.9999471998310394+0.004347213911084502j)
3 Execution time: 0:00:28.329445 ovlp:
(0.9998855996339189+0.007937625400401327j)
4 Execution time: 0:00:28.332983 ovlp:
(0.9997975993523178+0.012170438945404705j)
5 Execution time: 0:00:28.337306 ovlp:
(0.9997623992396776+0.013428842972297517j)
6 Execution time: 0:00:28.341828 ovlp:
(0.9994807983385547+0.016728853532331334j)
7 Execution time: 0:00:28.347280 ovlp:
(0.9994895983667147+0.018453659051709037j)
8 Execution time: 0:00:28.353331 ovlp:
(0.9992607976345524+0.024411278116089896j)
9 Execution time: 0:00:28.359951 ovlp:
(0.9991815973811116+0.028107289943327896j)
10 Execution time: 0:00:28.367229 ovlp:
(0.9988559963391883+0.030967299095357115j)
11 Execution time: 0:00:28.375101 ovlp:
(0.9986271956070258+0.030500897602872223j)

```

```
12 Execution time: 0:00:28.383868  ovlp:
(0.9983719947903833+0.034214509486430345j)
13 Execution time: 0:00:28.393088  ovlp:
(0.9982575944243022+0.03614171565349j)
14 Execution time: 0:00:28.402933  ovlp:
(0.9977119926783766+0.04337533880108424j)
15 Execution time: 0:00:28.413629  ovlp:
(0.9972631912422121+0.046666549332957885j)
16 Execution time: 0:00:28.425011  ovlp:
(0.9969375902002886+0.04885775634482026j)
17 Execution time: 0:00:28.437401  ovlp:
(0.9968495899186878+0.05025696082227471j)
18 Execution time: 0:00:28.450003  ovlp:
(0.9964007884825232+0.05102256327220256j)
19 Execution time: 0:00:28.463630  ovlp:
(0.9960751874405998+0.055176176563765056j)
20 Execution time: 0:00:28.479877  ovlp:
(0.9956263860044352+0.05605617937977403j)
21 Execution time: 0:00:28.494665  ovlp:
(0.9952127846809109+0.06107219543102538j)
22 Execution time: 0:00:28.510389  ovlp:
(0.9947639832447464+0.06647541272132074j)
x_points = [np.float64(0.0), np.float64(0.024834728124476704),
np.float64(0.04966945624895341), np.float64(0.07450418437343011),
np.float64(0.09933891249790681), np.float64(0.12417364062238352),
np.float64(0.14900836874686021), np.float64(0.17384309687133692),
np.float64(0.19867782499581363), np.float64(0.22351255312029034),
np.float64(0.24834728124476704), np.float64(0.27318200936924375),
np.float64(0.29801673749372043), np.float64(0.32285146561819716),
np.float64(0.34768619374267384), np.float64(0.3725209218671506),
np.float64(0.39735564999162726), np.float64(0.42219037811610394),
np.float64(0.44702510624058067), np.float64(0.47185983436505735),
np.float64(0.4966945624895341), np.float64(0.5215292906140108),
np.float64(0.5463640187384875)] y_points = [1.          +0.j
0.9999823999436799+0.00205920658946113j
0.9999471998310394+0.0043472139110845j
0.9998855996339189+0.00793762540040133j
0.9997975993523178+0.0121704389454047j
0.9997623992396776+0.01342884297229752j
0.9994807983385547+0.01672885353233133j
0.9994895983667147+0.01845365905170904j
0.9992607976345524+0.0244112781160899j
0.9991815973811116+0.0281072899433279j
0.9988559963391883+0.03096729909535711j
0.9986271956070258+0.03050089760287222j
0.9983719947903833+0.03421450948643034j
0.9982575944243022+0.03614171565349j]
```


0.9977119926783766+0.04337533880108424j
0.9972631912422121+0.04666654933295789j
0.9969375902002886+0.04885775634482026j
0.9968495899186878+0.05025696082227471j
0.9964007884825232+0.05102256327220256j
0.9960751874405998+0.05517617656376506j
0.9956263860044352+0.05605617937977403j
0.9952127846809109+0.06107219543102538j
0.9947639832447464+0.06647541272132074j]
fit1: [0.48878378734943 -0.24409322977369832]
[0.48878378734943 -0.24409322977369832 0.48879378724943
-0.] 1.5031959888032427e-10
[3.8628260972260653e-01 -2.4766182991364843e-01
4.0125149710673230e-01
-5.6364859399136498e-02 3.0581742312409398e-06]
1.6837425481202596e-10
E_gs: -0.24766182991364843
test mps sampling took: (0.0013051033020019531, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.09128409992125423
1 Execution time: 0:00:28.971161 ovlp:
(0.9998511997619197+0.012398419837471808j)
2 Execution time: 0:00:28.973111 ovlp:
(0.9992559988095981+0.0205440328704527j)
3 Execution time: 0:00:28.976445 ovlp:
(0.9986751978803166+0.032836852538963957j)
4 Execution time: 0:00:28.980159 ovlp:
(0.9976959963135941+0.04348326957323123j)
5 Execution time: 0:00:28.984884 ovlp:
(0.9964383943014308+0.055459288734861945j)
6 Execution time: 0:00:28.989990 ovlp:
(0.9948783918054269+0.06866410986257576j)
7 Execution time: 0:00:28.995548 ovlp:
(0.9929487887180619+0.07362731780370857j)
8 Execution time: 0:00:29.003209 ovlp:
(0.9911343858150172+0.08436013497621597j)
9 Execution time: 0:00:29.011004 ovlp:
(0.9878031804850889+0.09517455227928373j)
10 Execution time: 0:00:29.018920 ovlp:
(0.9852831764530823+0.10378576605722567j)
11 Execution time: 0:00:29.028138 ovlp:
(0.9824943719909951+0.11340498144797029j)
12 Execution time: 0:00:29.038121 ovlp:
(0.9788415661465057+0.12819380511008815j)
x_points = [np.float64(0.0), np.float64(0.09128409992125423),

```

np.float64(0.18256819984250847), np.float64(0.2738522997637627),
np.float64(0.36513639968501693), np.float64(0.4564204996062712),
np.float64(0.5477045995275254), np.float64(0.6389886994487797),
np.float64(0.7302727993700339), np.float64(0.8215568992912881),
np.float64(0.9128409992125424), np.float64(1.0041250991337967),
np.float64(1.0954091990550507)] y_points = [1.          +0.j
0.9998511997619197+0.01239841983747181j
0.9992559988095981+0.0205440328704527j
0.9986751978803166+0.03283685253896396j
0.9976959963135941+0.04348326957323123j
0.9964383943014308+0.05545928873486194j
0.9948783918054269+0.06866410986257576j
0.9929487887180619+0.07362731780370857j
0.9911343858150172+0.08436013497621597j
0.9878031804850889+0.09517455227928373j
0.9852831764530823+0.10378576605722567j
0.9824943719909951+0.11340498144797029j
0.9788415661465057+0.12819380511008815j]
fit1: [ 0.39295074594097007 -0.3003586138406248 ]
[ 0.39295074594097007 -0.3003586138406248  0.39296074584097007
-0.          ] 2.711273952636159e-10
[ 2.9410530769540322e-01 -3.1365940937245396e-01
3.0072027505917870e-01
-8.4747175995924295e-02  3.7311135921699291e-06]
4.0706378936220215e-10
E_gs: -0.31365940937245396
test mps sampling took: (0.0012536048889160156, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.25555948773106213
1 Execution time: 0:00:29.446739 ovlp:
(0.9987211982096775+0.029371041119457653j)
2 Execution time: 0:00:29.448556 ovlp:
(0.9954367936115112+0.06235308729432232j)
3 Execution time: 0:00:29.451068 ovlp:
(0.9897051855872598+0.0893091250327751j)
4 Execution time: 0:00:29.454238 ovlp:
(0.9818299745619643+0.11807756530859148j)
5 Execution time: 0:00:29.458032 ovlp:
(0.971976760767465+0.14271519980127967j)
6 Execution time: 0:00:29.462536 ovlp:
(0.9592807429930401+0.16869603617445073j)
7 Execution time: 0:00:29.467831 ovlp:
(0.9452599233638928+0.19671927540698553j)
8 Execution time: 0:00:29.473675 ovlp:
(0.9273842983380176+0.22137530992543386j)

```

```

9 Execution time: 0:00:29.480340 ovlp:
(0.912231877124628+0.24355654097915735j)
10 Execution time: 0:00:29.487654 ovlp:
(0.8915318481445873+0.26808377531728533j)
11 Execution time: 0:00:29.495549 ovlp:
(0.8704914186879862+0.2864562010386815j)
12 Execution time: 0:00:29.504091 ovlp:
(0.8477857869001018+0.30504022705631795j)
13 Execution time: 0:00:29.513509 ovlp:
(0.8256321558850181+0.32246505145107207j)
14 Execution time: 0:00:29.523419 ovlp:
(0.8009761213665698+0.33317386644341296j)
15 Execution time: 0:00:29.533956 ovlp:
(0.7759888863844409+0.35035949050328674j)
16 Execution time: 0:00:29.545249 ovlp:
(0.7513604519046326+0.3564130989783385j)
17 Execution time: 0:00:29.557358 ovlp:
(0.7222976112166557+0.36621111269555784j)
18 Execution time: 0:00:29.571969 ovlp:
(0.6978071769300478+0.36928391699748375j)
19 Execution time: 0:00:29.585652 ovlp:
(0.6744023441632818+0.37420592388829355j)
20 Execution time: 0:00:29.599657 ovlp:
(0.6482651075711505+0.3817591344627882j)
21 Execution time: 0:00:29.614295 ovlp:
(0.6232042724859814+0.3795787314102239j)
22 Execution time: 0:00:29.632125 ovlp:
(0.5987046381864936+0.3752915254081355j)
23 Execution time: 0:00:29.648323 ovlp:
(0.5732298025217235+0.3714459200242881j)
x_points = [np.float64(0.0), np.float64(0.25555948773106213),
np.float64(0.5111189754621243), np.float64(0.7666784631931864),
np.float64(1.0222379509242485), np.float64(1.2777974386553106),
np.float64(1.5333569263863729), np.float64(1.788916414117435),
np.float64(2.044475901848497), np.float64(2.300035389579559),
np.float64(2.555594877310621), np.float64(2.8111543650416833),
np.float64(3.0667138527727458), np.float64(3.322273340503808),
np.float64(3.57783282823487), np.float64(3.833392315965932),
np.float64(4.088951803696994), np.float64(4.344511291428057),
np.float64(4.600070779159118), np.float64(4.855630266890181),
np.float64(5.111189754621242), np.float64(5.366749242352305),
np.float64(5.6223087300833665), np.float64(5.877868217814429)] y_points
= [1.          +0.j
0.9987211982096775+0.02937104111945765j
0.9954367936115112+0.06235308729432232j
0.9897051855872598+0.0893091250327751j
0.9818299745619643+0.11807756530859148j

```

0.971976760767465 +0.14271519980127967j
 0.9592807429930401+0.16869603617445073j
 0.9452599233638928+0.19671927540698553j
 0.9273842983380176+0.22137530992543386j
 0.912231877124628 +0.24355654097915735j
 0.8915318481445873+0.26808377531728533j
 0.8704914186879862+0.2864562010386815j
 0.8477857869001018+0.30504022705631795j
 0.8256321558850181+0.32246505145107207j
 0.8009761213665698+0.33317386644341296j
 0.7759888863844409+0.35035949050328674j
 0.7513604519046326+0.3564130989783385j
 0.7222976112166557+0.36621111269555784j
 0.6978071769300478+0.36928391699748375j
 0.6744023441632818+0.37420592388829355j
 0.6482651075711505+0.3817591344627882j
 0.6232042724859814+0.3795787314102239j
 0.5987046381864936+0.3752915254081355j
 0.5732298025217235+0.3714459200242881j]
 fit1: [0.380353969909681 -0.2940501180228575]
 [0.30250611372845165 -0.334670901195457 0.37986909838133115
 -0.040554425439182] 1.6089834736875399e-09
 [0.2948125872687249 -0.3376785495341852 0.2659362819230517
 -0.05978506031245847 -0.00284719421196249] 1.4540539909018177e-09
 E_gs: -0.3376785495341852
 test mps sampling took: (0.0013277530670166016, Counter({2: 8, 0: 2}))
 truncated ham size: 12 Number of fitting points: 15
 shots per matrix element: 357142.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.24962328038980278
 1 Execution time: 0:00:30.069189 ovlp:
 (0.9988687972851136+0.029495270788649997j)
 2 Execution time: 0:00:30.071118 ovlp:
 (0.9954975891942142+0.057164937195849364j)
 3 Execution time: 0:00:30.073725 ovlp:
 (0.9900711761708227+0.08701860884466117j)
 4 Execution time: 0:00:30.077119 ovlp:
 (0.9830095592229422+0.11292427101825053j)
 5 Execution time: 0:00:30.080992 ovlp:
 (0.9731479355550454+0.14272194253266202j)
 6 Execution time: 0:00:30.085548 ovlp:
 (0.9614327074384978+0.16578279787871497j)
 7 Execution time: 0:00:30.090910 ovlp:
 (0.9473822737174569+0.19347486433967442j)
 8 Execution time: 0:00:30.096860 ovlp:
 (0.9328446388271332+0.21846212430909828j)
 9 Execution time: 0:00:30.104615 ovlp:

```

(0.9148349956039894+0.24028537668490402j)
10 Execution time: 0:00:30.113167 ovlp:
(0.8975309540742897+0.2612686270447049j)
11 Execution time: 0:00:30.121409 ovlp:
(0.8767213041311299+0.28151827564386145j)
12 Execution time: 0:00:30.130246 ovlp:
(0.8546348511236428+0.29940471857132467j)
13 Execution time: 0:00:30.139533 ovlp:
(0.8328563988553572+0.3183271639851937j)
14 Execution time: 0:00:30.151249 ovlp:
(0.8065195356468855+0.3285583885401324j)
x_points = [np.float64(0.0), np.float64(0.24962328038980278),
np.float64(0.49924656077960555), np.float64(0.7488698411694084),
np.float64(0.9984931215592111), np.float64(1.2481164019490139),
np.float64(1.4977396823388167), np.float64(1.7473629627286194),
np.float64(1.9969862431184222), np.float64(2.246609523508225),
np.float64(2.4962328038980277), np.float64(2.7458560842878303),
np.float64(2.9954793646776334), np.float64(3.245102645067436),
np.float64(3.4947259254572387)] y_points = [1.          +0.j
0.9988687972851136+0.02949527078865j
0.9954975891942142+0.05716493719584936j
0.9900711761708227+0.08701860884466117j
0.9830095592229422+0.11292427101825053j
0.9731479355550454+0.14272194253266202j
0.9614327074384978+0.16578279787871497j
0.9473822737174569+0.19347486433967442j
0.9328446388271332+0.21846212430909828j
0.9148349956039894+0.24028537668490402j
0.8975309540742897+0.2612686270447049j
0.8767213041311299+0.28151827564386145j
0.8546348511236428+0.29940471857132467j
0.8328563988553572+0.3183271639851937j
0.8065195356468855+0.3285583885401324j ]
fit1: [ 0.38106719435069597 -0.3020782178336815 ]
[ 0.38106719435069597 -0.3020782178336815  0.38107719425069597
-0.          ] 1.0422372087564954e-10
[ 2.7967646361323334e-01 -3.4912252449534431e-01
2.8569983786802033e-01
-6.8234268215960084e-02  4.7698077342937967e-06]
9.470503536441544e-11
E_gs: -0.3491225244953443
test mps sampling took: (0.0012850761413574219, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.06040336628432199
1 Execution time: 0:00:30.561210 ovlp:

```

```

(0.9999251998354397+0.005919413022708708j)
2 Execution time: 0:00:30.563176 ovlp:
(0.9996939993267986+0.013725830196826383j)
3 Execution time: 0:00:30.565841 ovlp:
(0.999394798668557+0.021858648089025712j)
4 Execution time: 0:00:30.569170 ovlp:
(0.9989187976213547+0.028182662001856373j)
5 Execution time: 0:00:30.573114 ovlp:
(0.9985039967087928+0.03193627025979451j)
6 Execution time: 0:00:30.577616 ovlp:
(0.9977423950332691+0.040987090171598295j)
7 Execution time: 0:00:30.583053 ovlp:
(0.9968651931034249+0.0455159001349803j)
8 Execution time: 0:00:30.588896 ovlp:
(0.99587919093422+0.05523312151286741j)
9 Execution time: 0:00:30.595533 ovlp:
(0.9949543888996555+0.0624683374303423j)
10 Execution time: 0:00:30.602904 ovlp:
(0.9935331857730088+0.06894195167229378j)
11 Execution time: 0:00:30.612180 ovlp:
(0.9926831839030046+0.07770037094081617j)
12 Execution time: 0:00:30.622115 ovlp:
(0.9907927797441154+0.08565638844405465j)
13 Execution time: 0:00:30.632288 ovlp:
(0.9887255751962654+0.08858719489182887j)
14 Execution time: 0:00:30.643518 ovlp:
(0.9872023718452181+0.09489080875977929j)
15 Execution time: 0:00:30.655324 ovlp:
(0.9857131685689708+0.10114002250804943j)
16 Execution time: 0:00:30.667950 ovlp:
(0.9841899652179236+0.1080556377224029j)
17 Execution time: 0:00:30.680018 ovlp:
(0.98140875909927+0.11724245793340748j)
x_points = [np.float64(0.0), np.float64(0.06040336628432199),
np.float64(0.12080673256864398), np.float64(0.18121009885296596),
np.float64(0.24161346513728796), np.float64(0.30201683142160995),
np.float64(0.3624201977059319), np.float64(0.42282356399025395),
np.float64(0.4832269302745759), np.float64(0.5436302965588979),
np.float64(0.6040336628432199), np.float64(0.6644370291275419),
np.float64(0.7248403954118638), np.float64(0.7852437616961858),
np.float64(0.8456471279805079), np.float64(0.9060504942648299),
np.float64(0.9664538605491518), np.float64(1.026857226833474)] y_points
= [1.          +0.j
0.9999251998354397+0.00591941302270871j
0.9996939993267986+0.01372583019682638j
0.999394798668557 +0.02185864808902571j
0.9989187976213547+0.02818266200185637j

```

0.9985039967087928+0.03193627025979451j
 0.9977423950332691+0.04098709017159829j
 0.9968651931034249+0.0455159001349803j
 0.99587919093422 +0.05523312151286741j
 0.9949543888996555+0.0624683374303423j
 0.9935331857730088+0.06894195167229378j
 0.9926831839030046+0.07770037094081617j
 0.9907927797441154+0.08565638844405465j
 0.9887255751962654+0.08858719489182887j
 0.9872023718452181+0.09489080875977929j
 0.9857131685689708+0.10114002250804943j
 0.9841899652179236+0.1080556377224029j
 0.98140875909927 +0.11724245793340748j
 fit1: [0.3568142668344906 -0.3220187047286477]
 [0.3568142668344906 -0.3220187047286477 0.3568242667344906
 -0.] 1.380104653195608e-10
 [2.7291361066052544e-01 -3.2091090784295068e-01
 2.9182356667395520e-01
 -9.3050459433916655e-02 -9.9999997494834049e-06]
 2.1152483191287563e-10
 E_gs: -0.3209109078429507
 test mps sampling took: (0.001338958740234375, Counter({0: 5, 2: 5}))
 truncated ham size: 12 Number of fitting points: 18
 shots per matrix element: 294117.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.0562783746661953
 1 Execution time: 0:00:31.245594 ovlp:
 (0.9999251998354397+0.004913010808623719j)
 2 Execution time: 0:00:31.247968 ovlp:
 (0.9997075993567186+0.010570623255371059j)
 3 Execution time: 0:00:31.250707 ovlp:
 (0.9994899988779975+0.019845843660855955j)
 4 Execution time: 0:00:31.254183 ovlp:
 (0.9991023980252756+0.02814866192705634j)
 5 Execution time: 0:00:31.258935 ovlp:
 (0.998544796798553+0.030698667537068625j)
 6 Execution time: 0:00:31.264079 ovlp:
 (0.9977559950631891+0.04049068907951603j)
 7 Execution time: 0:00:31.269512 ovlp:
 (0.9971711937766263+0.04533909974601946j)
 8 Execution time: 0:00:31.275645 ovlp:
 (0.9965455924003033+0.050942312073086526j)
 9 Execution time: 0:00:31.282466 ovlp:
 (0.9951447893185366+0.06106753434857559j)
 10 Execution time: 0:00:31.290164 ovlp:
 (0.9941587871493318+0.06535834378835625j)
 11 Execution time: 0:00:31.300012 ovlp:

```

(0.9932203850848471+0.07172315779094718j)
12 Execution time: 0:00:31.309796  ovlp:
(0.9921595827510821+0.08037277682010902j)
13 Execution time: 0:00:31.320705  ovlp:
(0.9909695801330762+0.08091677801691155j)
14 Execution time: 0:00:31.331183  ovlp:
(0.9893851766473887+0.09118480060656142j)
15 Execution time: 0:00:31.344233  ovlp:
(0.9875219725483395+0.09918161819955995j)
16 Execution time: 0:00:31.358090  ovlp:
(0.9858491688681714+0.10481203058646726j)
17 Execution time: 0:00:31.370314  ovlp:
(0.98348956367704+0.10719203582247872j)
x_points = [np.float64(0.0), np.float64(0.0562783746661953),
np.float64(0.1125567493323906), np.float64(0.1688351239985859),
np.float64(0.2251134986647812), np.float64(0.2813918733309765),
np.float64(0.3376702479971718), np.float64(0.3939486226633671),
np.float64(0.4502269973295624), np.float64(0.5065053719957577),
np.float64(0.562783746661953), np.float64(0.6190621213281483),
np.float64(0.6753404959943436), np.float64(0.7316188706605389),
np.float64(0.7878972453267342), np.float64(0.8441756199929294),
np.float64(0.9004539946591248), np.float64(0.9567323693253201)]
y_points = [1.          +0.j
0.9999251998354397+0.00491301080862372j
0.9997075993567186+0.01057062325537106j
0.9994899988779975+0.01984584366085596j
0.9991023980252756+0.02814866192705634j
0.998544796798553 +0.03069866753706862j
0.9977559950631891+0.04049068907951603j
0.9971711937766263+0.04533909974601946j
0.9965455924003033+0.05094231207308653j
0.9951447893185366+0.06106753434857559j
0.9941587871493318+0.06535834378835625j
0.9932203850848471+0.07172315779094718j
0.9921595827510821+0.08037277682010902j
0.9909695801330762+0.08091677801691155j
0.9893851766473887+0.09118480060656142j
0.9875219725483395+0.09918161819955995j
0.9858491688681714+0.10481203058646726j
0.98348956367704 +0.10719203582247872j]
fit1: [ 0.3721378357097281 -0.31177075445608926]
[ 0.3721378357097281 -0.31177075445608926 0.3721478356097281
 -0.          ] 1.7687543934914122e-10
[ 2.7473721367814208e-01 -3.2186447238932969e-01
2.9973164465289609e-01
-9.2275734576030818e-02 3.7059170799629746e-06]
2.710255597811239e-10

```


E_gs: -0.3218644723893297

test mps sampling took: (0.0013053417205810547, Counter({2: 7, 0: 3}))

truncated ham size: 12 Number of fitting points: 18

shots per matrix element: 294117.0

Total gate count: 224 2 qubit gates: 120

N gate: 224 dt: 0.1394512620753743

1 Execution time: 0:00:31.891541 ovlp:

(0.9996735992819183+0.014902232784912206j)

2 Execution time: 0:00:31.893514 ovlp:

(0.998537996783593+0.03133106892835169j)

3 Execution time: 0:00:31.896229 ovlp:

(0.9969331932530252+0.05125511276124817j)

4 Execution time: 0:00:31.900025 ovlp:

(0.9947435884358946+0.0676499488298874j)

5 Execution time: 0:00:31.904335 ovlp:

(0.9912551807613976+0.08223598091915796j)

6 Execution time: 0:00:31.909859 ovlp:

(0.9872499719499384+0.09473440841569847j)

7 Execution time: 0:00:31.915606 ovlp:

(0.98346916363216+0.11136044499297904j)

8 Execution time: 0:00:31.921645 ovlp:

(0.9783963524719754+0.12550447610984738j)

9 Execution time: 0:00:31.928396 ovlp:

(0.9727931401449084+0.14226651298632853j)

10 Execution time: 0:00:31.935772 ovlp:

(0.9662515257533566+0.15792694743928437j)

11 Execution time: 0:00:31.943886 ovlp:

(0.9592883104342829+0.17345818160799964j)

12 Execution time: 0:00:31.952624 ovlp:

(0.9517334938136863+0.18747301244062742j)

13 Execution time: 0:00:31.962562 ovlp:

(0.9426146737522823+0.19976063947340683j)

14 Execution time: 0:00:31.972643 ovlp:

(0.9352298575056865+0.21028026261657784j)

15 Execution time: 0:00:31.983308 ovlp:

(0.925199835439638+0.22588629694985318j)

16 Execution time: 0:00:31.996657 ovlp:

(0.9162578157671948+0.24097553014616624j)

17 Execution time: 0:00:32.009107 ovlp:

(0.9057313926090638+0.24908114797852554j)

x_points = [np.float64(0.0), np.float64(0.1394512620753743),
np.float64(0.2789025241507486), np.float64(0.41835378622612296),
np.float64(0.5578050483014972), np.float64(0.6972563103768715),
np.float64(0.8367075724522459), np.float64(0.9761588345276202),
np.float64(1.1156100966029945), np.float64(1.2550613586783688),
np.float64(1.394512620753743), np.float64(1.5339638828291173),
np.float64(1.6734151449044918), np.float64(1.8128664069798661),

```

np.float64(1.9523176690552404), np.float64(2.0917689311306145),
np.float64(2.231220193205989), np.float64(2.3706714552813635)] y_points
= [1.          +0.j
0.9996735992819183+0.01490223278491221j
0.998537996783593 +0.03133106892835169j
0.9969331932530252+0.05125511276124817j
0.9947435884358946+0.0676499488298874j
0.9912551807613976+0.08223598091915796j
0.9872499719499384+0.09473440841569847j
0.98346916363216 +0.11136044499297904j
0.9783963524719754+0.12550447610984738j
0.9727931401449084+0.14226651298632853j
0.9662515257533566+0.15792694743928437j
0.9592883104342829+0.17345818160799964j
0.9517334938136863+0.18747301244062742j
0.9426146737522823+0.19976063947340683j
0.9352298575056865+0.21028026261657784j
0.925199835439638 +0.22588629694985318j
0.9162578157671948+0.24097553014616624j
0.9057313926090638+0.24908114797852554j]
fit1: [ 0.38466801440681897 -0.3010304255320472 ]
[ 0.38466801440681897 -0.3010304255320472  0.38467801430681897
-0.          ] 2.0919136134490214e-10
[ 2.8055071773531903e-01 -3.5028870980762017e-01
2.9862696900814784e-01
-6.1542955829106176e-02  3.5507195310604688e-06]
1.3837698233000983e-10
E_gs: -0.35028870980762017
test mps sampling took: (0.0012631416320800781, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.021288849090868544
1 Execution time: 0:00:32.403505 ovlp:
(0.9999943999865599+0.0016576039782496554j)
2 Execution time: 0:00:32.405499 ovlp:
(0.9999663999193598+0.004228010147224293j)
3 Execution time: 0:00:32.408205 ovlp:
(0.9999159997983995+0.008887221329331174j)
4 Execution time: 0:00:32.411509 ovlp:
(0.9998543996505591+0.01220802929927034j)
5 Execution time: 0:00:32.415494 ovlp:
(0.9997815994758388+0.013574432578638218j)
6 Execution time: 0:00:32.420197 ovlp:
(0.9997815994758388+0.014761635427924968j)
7 Execution time: 0:00:32.425666 ovlp:
(0.9996135990726378+0.014196034070481867j)

```

```

8 Execution time: 0:00:32.431876 ovlp:
(0.9995351988844774+0.019952847886834935j)
9 Execution time: 0:00:32.438495 ovlp:
(0.9992383981721555+0.02290965498317199j)
10 Execution time: 0:00:32.445899 ovlp:
(0.9992999983199959+0.025659261582227755j)
11 Execution time: 0:00:32.454057 ovlp:
(0.9991991980780754+0.0285376684904044j)
12 Execution time: 0:00:32.462948 ovlp:
(0.9988407972179134+0.028940869458086604j)
13 Execution time: 0:00:32.474075 ovlp:
(0.9986559967743922+0.03130967514322025j)
14 Execution time: 0:00:32.486795 ovlp:
(0.9983479960351904+0.03452968287123892j)
x_points = [np.float64(0.0), np.float64(0.021288849090868544),
np.float64(0.04257769818173709), np.float64(0.06386654727260563),
np.float64(0.08515539636347418), np.float64(0.10644424545434272),
np.float64(0.12773309454521126), np.float64(0.14902194363607982),
np.float64(0.17031079272694835), np.float64(0.19159964181781688),
np.float64(0.21288849090868545), np.float64(0.23417733999955398),
np.float64(0.2554661890904225), np.float64(0.27675503818129105),
np.float64(0.29804388727215964)] y_points = [1.          +0.j
0.9999943999865599+0.00165760397824966j
0.9999663999193598+0.00422801014722429j
0.9999159997983995+0.00888722132933117j
0.9998543996505591+0.01220802929927034j
0.9997815994758388+0.01357443257863822j
0.9997815994758388+0.01476163542792497j
0.9996135990726378+0.01419603407048187j
0.9995351988844774+0.01995284788683493j
0.9992383981721555+0.02290965498317199j
0.9992999983199959+0.02565926158222775j
0.9991991980780754+0.0285376684904044j
0.9988407972179134+0.0289408694580866j
0.9986559967743922+0.03130967514322025j
0.9983479960351904+0.03452968287123892j]
fit1: [ 0.18242081236302699 -0.6435014192634221 ]
[ 0.18242081236302699 -0.6435014192634221  0.182430812263027
-0.          ] 9.366747482483808e-11
[ 1.6016714785975300e-01 -5.6565765487246011e-01
1.6004978539597184e-01
-2.0456616287023618e-01  1.2323424111534591e-06]
2.2901195835966772e-10
E_gs: -0.5656576548724601
test mps sampling took: (0.0012972354888916016, Counter({2: 8, 0: 2}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0

```

Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.16536368326661952
 1 Execution time: 0:00:32.974666 ovlp:
 (0.9995160000000001+0.01754999999999995j)
 2 Execution time: 0:00:32.977089 ovlp:
 (0.9981359999999999+0.03861000000000003j)
 3 Execution time: 0:00:32.980221 ovlp:
 (0.9957419999999999+0.05781600000000009j)
 4 Execution time: 0:00:32.983776 ovlp:
 (0.9922439999999999+0.07645999999999997j)
 5 Execution time: 0:00:32.988456 ovlp:
 (0.9877480000000001+0.09435199999999999j)
 x_points = [np.float64(0.0), np.float64(0.16536368326661952),
 np.float64(0.33072736653323903), np.float64(0.4960910497998585),
 np.float64(0.6614547330664781), np.float64(0.8268184163330976)] y_points
 = [1. +0.j
 0.9995160000000001+0.01754999999999995j
 0.9981359999999999+0.03861000000000003j
 0.9957419999999999+0.05781600000000009j
 0.9922439999999999+0.07645999999999997j
 0.9877480000000001+0.09435199999999999j]
 fit1: [0.30798454696417005 -0.3776931034461408]
 [0.30798454696417005 -0.3776931034461408 0.30799454686417005
 -0.] 3.569781477888363e-11
 [2.6368141769733661e-01 -3.2383068333646908e-01
 2.6351510635228043e-01
 -1.2168895397547420e-01 1.4461863896782632e-06]
 2.4100304099445457e-11
 E_gs: -0.3238306833364691
 test mps sampling took: (0.0012674331665039062, Counter({0: 8, 2: 2}))
 truncated ham size: 12 Number of fitting points: 20
 shots per matrix element: 263157.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.19570554619009542
 1 Execution time: 0:00:33.415573 ovlp:
 (0.999384397906953+0.024156682132719265j)
 2 Execution time: 0:00:33.417463 ovlp:
 (0.997324790904289+0.04599915639713181j)
 3 Execution time: 0:00:33.420116 ovlp:
 (0.9941859802323327+0.06794803102330538j)
 4 Execution time: 0:00:33.423489 ovlp:
 (0.9894511641339581+0.09011730639884186j)
 5 Execution time: 0:00:33.427443 ovlp:
 (0.9840019456066151+0.10999137397067149j)
 6 Execution time: 0:00:33.432010 ovlp:
 (0.9755507168724373+0.1308990450567531j)
 7 Execution time: 0:00:33.438264 ovlp:

```

(0.966696686768735+0.1571115341792162j)
8 Execution time: 0:00:33.445198 ovlp:
(0.9582758581379176+0.1760051984176747j)
9 Execution time: 0:00:33.452662 ovlp:
(0.9475978218325942+0.19355365808243752j)
10 Execution time: 0:00:33.461025 ovlp:
(0.9349285787571677+0.2141421280832354j)
11 Execution time: 0:00:33.470281 ovlp:
(0.9226773371029462+0.23392499534498423j)
12 Execution time: 0:00:33.479184 ovlp:
(0.9073784850868494+0.2516558556299091j)
13 Execution time: 0:00:33.489602 ovlp:
(0.8920340329157119+0.26723590860208923j)
14 Execution time: 0:00:33.500728 ovlp:
(0.8781791858092318+0.28305916240115225j)
15 Execution time: 0:00:33.512000 ovlp:
(0.8609879273589531+0.29693680958515256j)
16 Execution time: 0:00:33.523480 ovlp:
(0.8410834596837629+0.31183286023172485j)
17 Execution time: 0:00:33.535569 ovlp:
(0.8238922012334842+0.32279969751897153j)
18 Execution time: 0:00:33.548177 ovlp:
(0.8070353439201694+0.33155492728675284j)
19 Execution time: 0:00:33.561376 ovlp:
(0.7875260775886639+0.3411081597677432j)
x_points = [np.float64(0.0), np.float64(0.19570554619009542),
np.float64(0.39141109238019084), np.float64(0.5871166385702863),
np.float64(0.7828221847603817), np.float64(0.9785277309504771),
np.float64(1.1742332771405726), np.float64(1.369938823330668),
np.float64(1.5656443695207634), np.float64(1.7613499157108587),
np.float64(1.9570554619009541), np.float64(2.1527610080910495),
np.float64(2.348466554281145), np.float64(2.5441721004712403),
np.float64(2.739877646661336), np.float64(2.935583192851431),
np.float64(3.1312887390415267), np.float64(3.3269942852316223),
np.float64(3.5226998314217175), np.float64(3.718405377611813)] y_points =
[1.          +0.j
0.999384397906953 +0.02415668213271926j
0.997324790904289 +0.04599915639713181j
0.9941859802323327+0.06794803102330538j
0.9894511641339581+0.09011730639884186j
0.9840019456066151+0.10999137397067149j
0.9755507168724373+0.1308990450567531j
0.966696686768735 +0.1571115341792162j
0.9582758581379176+0.1760051984176747j
0.9475978218325942+0.19355365808243752j
0.9349285787571677+0.2141421280832354j
0.9226773371029462+0.23392499534498423j

```

0.9073784850868494+0.2516558556299091j
 0.8920340329157119+0.26723590860208923j
 0.8781791858092318+0.28305916240115225j
 0.8609879273589531+0.29693680958515256j
 0.8410834596837629+0.31183286023172485j
 0.8238922012334842+0.32279969751897153j
 0.8070353439201694+0.33155492728675284j
 0.7875260775886639+0.3411081597677432j]
 fit1: [0.38347250614932527 -0.30017149753860495]
 [0.38347250614932527 -0.30017149753860495 0.38348250604932527
 -0.] 5.612679473700235e-10
 [3.1286657742475216e-01 -3.3165743693289357e-01
 2.5283114829860748e-01
 -5.0947662369663402e-02 3.6974741678208395e-06]
 1.4044524548066908e-10
 E_gs: -0.33165743693289357
 test mps sampling took: (0.0013611316680908203, Counter({0: 9, 2: 1}))
 truncated ham size: 12 Number of fitting points: 22
 shots per matrix element: 238095.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.27019240929294064
 1 Execution time: 0:00:33.983720 ovlp:
 (0.9984459984459984+0.02995022995022989j)
 2 Execution time: 0:00:33.985739 ovlp:
 (0.9949263949263949+0.06183666183666192j)
 3 Execution time: 0:00:33.988458 ovlp:
 (0.9882567882567883+0.09192549192549193j)
 4 Execution time: 0:00:33.992457 ovlp:
 (0.9790839790839792+0.12208152208152212j)
 5 Execution time: 0:00:33.996716 ovlp:
 (0.9684243684243685+0.1515403515403515j)
 6 Execution time: 0:00:34.002350 ovlp:
 (0.9548751548751548+0.18183078183078183j)
 7 Execution time: 0:00:34.008925 ovlp:
 (0.9385203385203384+0.20892920892920896j)
 8 Execution time: 0:00:34.016338 ovlp:
 (0.9228375228375227+0.2308028308028307j)
 9 Execution time: 0:00:34.023341 ovlp:
 (0.9028455028455029+0.2542724542724544j)
 10 Execution time: 0:00:34.032047 ovlp:
 (0.8787626787626788+0.27457527457527453j)
 11 Execution time: 0:00:34.041607 ovlp:
 (0.8574602574602574+0.299078099078099j)
 12 Execution time: 0:00:34.050521 ovlp:
 (0.8332850332850332+0.31545811545811553j)
 13 Execution time: 0:00:34.060059 ovlp:
 (0.808009408009408+0.3296709296709297j)

```

14 Execution time: 0:00:34.070395  ovlp:
(0.7802977802977804+0.3459585459585459j)
15 Execution time: 0:00:34.082231  ovlp:
(0.7554253554253554+0.35768495768495767j)
16 Execution time: 0:00:34.093745  ovlp:
(0.7261765261765263+0.3673029673029673j)
17 Execution time: 0:00:34.105950  ovlp:
(0.6977340977340978+0.37050337050337045j)
18 Execution time: 0:00:34.118685  ovlp:
(0.6765408765408765+0.37369537369537364j)
19 Execution time: 0:00:34.131904  ovlp:
(0.6436716436716436+0.3732249732249733j)
20 Execution time: 0:00:34.148366  ovlp:
(0.6194628194628196+0.3794745794745795j)
21 Execution time: 0:00:34.163431  ovlp:
(0.5928347928347928+0.37172137172137165j)
x_points = [np.float64(0.0), np.float64(0.27019240929294064),
np.float64(0.5403848185858813), np.float64(0.8105772278788219),
np.float64(1.0807696371717626), np.float64(1.3509620464647032),
np.float64(1.6211544557576438), np.float64(1.8913468650505845),
np.float64(2.161539274343525), np.float64(2.4317316836364657),
np.float64(2.7019240929294064), np.float64(2.972116502222347),
np.float64(3.2423089115152877), np.float64(3.5125013208082283),
np.float64(3.782693730101169), np.float64(4.05288613939411),
np.float64(4.32307854868705), np.float64(4.593270957979991),
np.float64(4.8634633672729315), np.float64(5.133655776565872),
np.float64(5.403848185858813), np.float64(5.674040595151753)] y_points =
[1.          +0.j
 0.9984459984459984+0.02995022995022989j
 0.9949263949263949+0.06183666183666192j
 0.9882567882567883+0.09192549192549193j
 0.9790839790839792+0.12208152208152212j
 0.9684243684243685+0.1515403515403515j
 0.9548751548751548+0.18183078183078183j
 0.9385203385203384+0.20892920892920896j
 0.9228375228375227+0.2308028308028307j
 0.9028455028455029+0.2542724542724544j
 0.8787626787626788+0.27457527457527453j
 0.8574602574602574+0.299078099078099j
 0.8332850332850332+0.31545811545811553j
 0.808009408009408 +0.3296709296709297j
 0.7802977802977804+0.3459585459585459j
 0.7554253554253554+0.35768495768495767j
 0.7261765261765263+0.3673029673029673j
 0.6977340977340978+0.37050337050337045j
 0.6765408765408765+0.37369537369537364j
 0.6436716436716436+0.3732249732249733j

```

0.6194628194628196+0.3794745794745795j
0.5928347928347928+0.37172137172137165j]
fit1: [0.3791059850134037 -0.29528410898080865]
[0.3048645245217317 -0.3334404262188129 0.3760890677276796
-0.03883756937336569] 1.2890766834654469e-09
[0.2991645790598003 -0.3360160626302791 0.28376867094722547
-0.0513304989074879 -0.00313373542815466] 1.2381534821702424e-09
E_gs: -0.3360160626302791
test mps sampling took: (0.0012979507446289062, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.256508094424558
1 Execution time: 0:00:34.538492 ovlp:
(0.9988239988239989+0.030798630798630766j)
2 Execution time: 0:00:34.541281 ovlp:
(0.9954303954303954+0.060055860055860055j)
3 Execution time: 0:00:34.544197 ovlp:
(0.9896931896931898+0.08688548688548692j)
4 Execution time: 0:00:34.548098 ovlp:
(0.9821415821415822+0.1154455154455154j)
5 Execution time: 0:00:34.552748 ovlp:
(0.9708183708183709+0.14700434700434695j)
6 Execution time: 0:00:34.558645 ovlp:
(0.9583443583443583+0.17191877191877203j)
7 Execution time: 0:00:34.564474 ovlp:
(0.9445431445431445+0.2009408009408009j)
8 Execution time: 0:00:34.571371 ovlp:
(0.928927528927529+0.22220962220962215j)
9 Execution time: 0:00:34.579578 ovlp:
(0.9091959091959092+0.2444612444612444j)
10 Execution time: 0:00:34.587359 ovlp:
(0.891917091917092+0.2661248661248661j)
11 Execution time: 0:00:34.595966 ovlp:
(0.8704298704298705+0.28729288729288727j)
12 Execution time: 0:00:34.605157 ovlp:
(0.8486150486150486+0.30557130557130563j)
13 Execution time: 0:00:34.615621 ovlp:
(0.824028224028224+0.31773451773451766j)
14 Execution time: 0:00:34.627641 ovlp:
(0.8002730002730003+0.3332073332073333j)
15 Execution time: 0:00:34.639980 ovlp:
(0.7759213759213759+0.34580734580734585j)
16 Execution time: 0:00:34.651550 ovlp:
(0.7501585501585502+0.3588441588441589j)
17 Execution time: 0:00:34.664053 ovlp:
(0.7248577248577248+0.3657405657405657j)


```
18 Execution time: 0:00:34.677058  ovlp:
(0.699010899010899+0.37032697032697026j)
19 Execution time: 0:00:34.692914  ovlp:
(0.6733824733824734+0.3763413763413763j)
20 Execution time: 0:00:34.708501  ovlp:
(0.6467460467460469+0.37603897603897596j)
21 Execution time: 0:00:34.724839  ovlp:
(0.6204876204876204+0.37201537201537205j)
x_points = [np.float64(0.0), np.float64(0.256508094424558),
np.float64(0.513016188849116), np.float64(0.7695242832736741),
np.float64(1.026032377698232), np.float64(1.2825404721227902),
np.float64(1.5390485665473481), np.float64(1.795556660971906),
np.float64(2.052064755396464), np.float64(2.3085728498210223),
np.float64(2.5650809442455804), np.float64(2.821589038670138),
np.float64(3.0780971330946962), np.float64(3.3346052275192544),
np.float64(3.591113321943812), np.float64(3.84762141636837),
np.float64(4.104129510792928), np.float64(4.3606376052174864),
np.float64(4.617145699642045), np.float64(4.873653794066603),
np.float64(5.130161888491161), np.float64(5.386669982915718)] y_points =
[1.          +0.j
0.9988239988239989+0.03079863079863077j
0.9954303954303954+0.06005586005586006j
0.9896931896931898+0.08688548688548692j
0.9821415821415822+0.1154455154455154j
0.9708183708183709+0.14700434700434695j
0.9583443583443583+0.17191877191877203j
0.9445431445431445+0.2009408009408009j
0.928927528927529 +0.22220962220962215j
0.9091959091959092+0.2444612444612444j
0.891917091917092 +0.2661248661248661j
0.8704298704298705+0.28729288729288727j
0.8486150486150486+0.30557130557130563j
0.824028224028224 +0.31773451773451766j
0.8002730002730003+0.3332073332073333j
0.7759213759213759+0.34580734580734585j
0.7501585501585502+0.3588441588441589j
0.7248577248577248+0.3657405657405657j
0.699010899010899 +0.37032697032697026j
0.6733824733824734+0.3763413763413763j
0.6467460467460469+0.37603897603897596j
0.6204876204876204+0.37201537201537205j]
fit1: [ 0.378057577184795 -0.2969158785207635]
[ 0.29893357724666547 -0.3372991832812868  0.3776238558951817
-0.04110611541800831] 4.533395883785428e-10
[ 0.2953585071660371 -0.33916891816557077  0.282236250145426
-0.05030859790550795 -0.00494248592849104] 4.499056940716147e-10
E_gs: -0.33916891816557077
```

```

test mps sampling took: (0.0012922286987304688, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.12445393209930605
1 Execution time: 0:00:35.123649 ovlp:
(0.9997311997311997+0.014421414421414314j)
2 Execution time: 0:00:35.125810 ovlp:
(0.998899598899599+0.027085827085827185j)
3 Execution time: 0:00:35.129295 ovlp:
(0.9975191975191975+0.04400904400904393j)
4 Execution time: 0:00:35.132850 ovlp:
(0.9956067956067955+0.057726257726257835j)
5 Execution time: 0:00:35.137405 ovlp:
(0.9930307930307931+0.07328867328867328j)
6 Execution time: 0:00:35.142491 ovlp:
(0.99011039011039+0.0843066843066842j)
7 Execution time: 0:00:35.147918 ovlp:
(0.9865347865347864+0.09980469980469975j)
x_points = [np.float64(0.0), np.float64(0.12445393209930605),
np.float64(0.2489078641986121), np.float64(0.37336179629791816),
np.float64(0.4978157283972242), np.float64(0.6222696604965303),
np.float64(0.7467235925958363), np.float64(0.8711775246951423)] y_points
= [1.          +0.j
0.9997311997311997+0.01442141442141431j
0.998899598899599 +0.02708582708582719j
0.9975191975191975+0.04400904400904393j
0.9956067956067955+0.05772625772625783j
0.9930307930307931+0.07328867328867328j
0.99011039011039 +0.0843066843066842j
0.9865347865347864+0.09980469980469975j]
fit1: [ 0.43979396976616136 -0.2627922385092767 ]
[ 0.43979396976616136 -0.2627922385092767  0.43980396966616137
-0.          ] 2.938164661959235e-11
[ 3.7793872249777200e-01 -2.2590759943638578e-01
3.7838484023615326e-01
-8.1157096624847339e-02 1.4205127830892869e-06]
6.231047340683757e-10
E_gs: -0.22590759943638578
test mps sampling took: (0.00133514404296875, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2682109267772668
1 Execution time: 0:00:35.662592 ovlp:
(0.9987483987483987+0.03462903462903455j)
2 Execution time: 0:00:35.664634 ovlp:

```

(0.994951594951595+0.061979461979462025j)
3 Execution time: 0:00:35.667568 ovlp:
(0.9884415884415885+0.09391629391629386j)
4 Execution time: 0:00:35.671064 ovlp:
(0.9795795795795796+0.11981351981351973j)
5 Execution time: 0:00:35.676500 ovlp:
(0.9685923685923685+0.15228795228795233j)
6 Execution time: 0:00:35.681572 ovlp:
(0.955051555051555+0.17810957810957806j)
7 Execution time: 0:00:35.687289 ovlp:
(0.9400659400659401+0.20508200508200503j)
8 Execution time: 0:00:35.694459 ovlp:
(0.9231231231231232+0.23297003297003305j)
9 Execution time: 0:00:35.701774 ovlp:
(0.9029547029547029+0.25798525798525795j)
10 Execution time: 0:00:35.709973 ovlp:
(0.880904680904681+0.27723807723807714j)
11 Execution time: 0:00:35.719256 ovlp:
(0.8598962598962598+0.2977172977172977j)
12 Execution time: 0:00:35.728115 ovlp:
(0.8343770343770345+0.3167685167685168j)
13 Execution time: 0:00:35.737527 ovlp:
(0.8105966105966107+0.33089733089733087j)
14 Execution time: 0:00:35.747740 ovlp:
(0.7852201852201852+0.34359814359814367j)
15 Execution time: 0:00:35.758643 ovlp:
(0.7585501585501586+0.3540141540141539j)
16 Execution time: 0:00:35.770094 ovlp:
(0.7301161301161301+0.3600873600873602j)
17 Execution time: 0:00:35.781955 ovlp:
(0.7047649047649047+0.36902496902496895j)
18 Execution time: 0:00:35.794782 ovlp:
(0.6754908754908755+0.3729309729309729j)
19 Execution time: 0:00:35.810276 ovlp:
(0.65006405006405+0.3768957768957768j)
20 Execution time: 0:00:35.824560 ovlp:
(0.6201600201600201+0.3762237762237761j)
21 Execution time: 0:00:35.839336 ovlp:
(0.5977739977739978+0.3736533736533736j)
x_points = [np.float64(0.0), np.float64(0.2682109267772668),
np.float64(0.5364218535545336), np.float64(0.8046327803318005),
np.float64(1.0728437071090673), np.float64(1.341054633886334),
np.float64(1.609265560663601), np.float64(1.8774764874408678),
np.float64(2.1456874142181346), np.float64(2.4138983409954013),
np.float64(2.682109267772668), np.float64(2.950320194549935),
np.float64(3.218531121327202), np.float64(3.486742048104469),
np.float64(3.7549529748817356), np.float64(4.023163901659002),

```

np.float64(4.291374828436269), np.float64(4.559585755213536),
np.float64(4.827796681990803), np.float64(5.09600760876807),
np.float64(5.364218535545336), np.float64(5.632429462322603)] y_points
= [1.          +0.j
0.9987483987483987+0.03462903462903455j
0.994951594951595 +0.06197946197946202j
0.9884415884415885+0.09391629391629386j
0.9795795795795796+0.11981351981351973j
0.9685923685923685+0.15228795228795233j
0.955051555051555 +0.17810957810957806j
0.9400659400659401+0.20508200508200503j
0.9231231231231232+0.23297003297003305j
0.9029547029547029+0.25798525798525795j
0.880904680904681 +0.27723807723807714j
0.8598962598962598+0.2977172977172977j
0.8343770343770345+0.3167685167685168j
0.8105966105966107+0.33089733089733087j
0.7852201852201852+0.34359814359814367j
0.7585501585501586+0.3540141540141539j
0.7301161301161301+0.3600873600873602j
0.7047649047649047+0.36902496902496895j
0.6754908754908755+0.3729309729309729j
0.65006405006405 +0.3768957768957768j
0.6201600201600201+0.3762237762237761j
0.5977739977739978+0.3736533736533736j ]
fit1: [ 0.38018417119191356 -0.2951102041350297 ]
[ 0.3078511186935286 -0.3320384637373642  0.38016313191821877
-0.03661177030957953] 8.941362267412642e-10
[ 0.28698924668613507 -0.34354513315252183  0.28279431748509726
-0.05793827466734532 -0.00481865287284289] 5.551121517129633e-10
E_gs: -0.34354513315252183
test mps sampling took: (0.0012996196746826172, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.22170638688834435
1 Execution time: 0:00:36.254865 ovlp:
(0.999096399096399+0.024687024687024772j)
2 Execution time: 0:00:36.257159 ovlp:
(0.9966375966375967+0.05297225297225294j)
3 Execution time: 0:00:36.260074 ovlp:
(0.9924507924507924+0.0775350775350776j)
4 Execution time: 0:00:36.263573 ovlp:
(0.9866403866403866+0.10279630279630281j)
5 Execution time: 0:00:36.268736 ovlp:
(0.9783963783963785+0.1260883260883261j)
6 Execution time: 0:00:36.273887 ovlp:

```

```

(0.969021969021969+0.15027675027675036j)
7 Execution time: 0:00:36.280456 ovlp:
(0.9584631584631584+0.17491877491877483j)
8 Execution time: 0:00:36.287329 ovlp:
(0.9455355455355456+0.19503919503919498j)
9 Execution time: 0:00:36.294249 ovlp:
(0.9316755316755316+0.2174204174204175j)
x_points = [np.float64(0.0), np.float64(0.22170638688834435),
np.float64(0.4434127737766887), np.float64(0.6651191606650331),
np.float64(0.8868255475533774), np.float64(1.1085319344417217),
np.float64(1.3302383213300661), np.float64(1.5519447082184104),
np.float64(1.7736510951067548), np.float64(1.9953574819950992)] y_points
= [1.          +0.j
0.999096399096399 +0.02468702468702477j
0.9966375966375967+0.05297225297225294j
0.9924507924507924+0.0775350775350776j
0.9866403866403866+0.10279630279630281j
0.9783963783963785+0.1260883260883261j
0.969021969021969 +0.15027675027675036j
0.9584631584631584+0.17491877491877483j
0.9455355455355456+0.19503919503919498j
0.9316755316755316+0.2174204174204175j ]
fit1: [ 0.3743189668623005 -0.3118349588455974]
[ 0.3743189668623005 -0.3118349588455974  0.3743289667623005
 -0.          ] 2.4981446974303517e-11
[ 2.825454326558430e-01 -3.448520047603273e-01
 2.842688059740457e-01
 -6.758174876006388e-02  4.844757940646422e-06]
1.071551780382331e-11
E_gs: -0.3448520047603273
test mps sampling took: (0.0013146400451660156, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2270976288576683
1 Execution time: 0:00:36.735285 ovlp:
(0.9989631970969519+0.026586074441008467j)
2 Execution time: 0:00:36.737275 ovlp:
(0.996421589980452+0.05541495516187456j)
3 Execution time: 0:00:36.740540 ovlp:
(0.991460776090173+0.07827501917005364j)
4 Execution time: 0:00:36.744217 ovlp:
(0.9856503598210076+0.10218628612160119j)
5 Execution time: 0:00:36.748572 ovlp:
(0.977298336435342+0.12859596006868812j)
6 Execution time: 0:00:36.753279 ovlp:
(0.9678591100055081+0.1521976261533533j)

```

```

7 Execution time: 0:00:36.758801 ovlp:
(0.9566630786566201+0.17980970346716973j)
8 Execution time: 0:00:36.764846 ovlp:
(0.9442286438402028+0.20282096789871007j)
9 Execution time: 0:00:36.771627 ovlp:
(0.929202201766165+0.22295222426622785j)
10 Execution time: 0:00:36.779088 ovlp:
(0.9134701577164417+0.24032587291244423j)
11 Execution time: 0:00:36.788396 ovlp:
(0.8949229057841361+0.2641291395615908j)
12 Execution time: 0:00:36.798289 ovlp:
(0.8771100559081566+0.2813227877038056j)
13 Execution time: 0:00:36.807800 ovlp:
(0.8583756034516896+0.2971412319954496j)
14 Execution time: 0:00:36.819627 ovlp:
(0.8379707463180897+0.3142052797747834j)
15 Execution time: 0:00:36.830664 ovlp:
(0.816845887168484+0.3255669115873525j)
16 Execution time: 0:00:36.842077 ovlp:
(0.7958938285027197+0.3372669443474441j)
17 Execution time: 0:00:36.854280 ovlp:
(0.7758849724779229+0.3489669771075359j)
18 Execution time: 0:00:36.867173 ovlp:
(0.7510953030668486+0.35677899898119714j)
x_points = [np.float64(0.0), np.float64(0.2270976288576683),
np.float64(0.4541952577153366), np.float64(0.6812928865730049),
np.float64(0.9083905154306732), np.float64(1.1354881442883415),
np.float64(1.3625857731460098), np.float64(1.589683402003678),
np.float64(1.8167810308613463), np.float64(2.043878659719015),
np.float64(2.270976288576683), np.float64(2.4980739174343514),
np.float64(2.7251715462920196), np.float64(2.952269175149688),
np.float64(3.179366804007356), np.float64(3.4064644328650244),
np.float64(3.6335620617226927), np.float64(3.860659690580361),
np.float64(4.08775731943803)] y_points = [1.          +0.j
0.9989631970969519+0.02658607444100847j
0.996421589980452 +0.05541495516187456j
0.991460776090173 +0.07827501917005364j
0.9856503598210076+0.10218628612160119j
0.977298336435342 +0.12859596006868812j
0.9678591100055081+0.1521976261533533j
0.9566630786566201+0.17980970346716973j
0.9442286438402028+0.20282096789871007j
0.929202201766165 +0.22295222426622785j
0.9134701577164417+0.24032587291244423j
0.8949229057841361+0.2641291395615908j
0.8771100559081566+0.2813227877038056j
0.8583756034516896+0.2971412319954496j

```

```

0.8379707463180897+0.3142052797747834j
0.816845887168484 +0.3255669115873525j
0.7958938285027197+0.3372669443474441j
0.7758849724779229+0.3489669771075359j
0.7510953030668486+0.35677899898119714j]
fit1: [ 0.38376454161592427 -0.29875560776118065]
[ 0.3525434962642323 -0.3127088791144248 0.38369056828953546
-0.01384785315149457] 5.248715038648657e-10
[ 0.2947808088623002 -0.34040359059806996 0.28315149905680836
-0.0564274469591559 -0.00121978516446155] 1.5856678893548377e-10
E_gs: -0.34040359059806996
test mps sampling took: (0.0013017654418945312, Counter({0: 8, 2: 2}))
truncated ham size: 12 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.01985999905306108
1 Execution time: 0:00:37.310380 ovlp:
(0.9999936+0.00319840000000000457j)
2 Execution time: 0:00:37.312297 ovlp:
(0.99996+0.005103999999999997j)
3 Execution time: 0:00:37.314924 ovlp:
(0.9999312+0.006359999999999921j)
4 Execution time: 0:00:37.318323 ovlp:
(0.9998768+0.009657599999999933j)
x_points = [np.float64(0.0), np.float64(0.01985999905306108),
np.float64(0.03971999810612216), np.float64(0.05957999715918324),
np.float64(0.07943999621224432)] y_points = [1. +0.j
0.9999936+0.003198400000000005j
0.99996 +0.005104j 0.9999312+0.00635999999999992j
0.9998768+0.00965759999999993j]
fit1: [ 0.0776861801612107 -2.085204093474931 ]
[ 0.0776861801612107 -2.085204093474931 0.0776961800612107
-0. ] 1.2013631261133316e-10
[ 7.000314609671876e-02 -1.879027325593637e+00
7.001068118766729e-02
-8.307808759878753e-01 9.895211173778301e-07] 7.515314611020672e-10
E_gs: -1.879027325593637
test mps sampling took: (0.001280069351196289, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.024754224285904507
1 Execution time: 0:00:37.476802 ovlp: (1+0.003340211356718692j)
2 Execution time: 0:00:37.478700 ovlp:
(0.9999695998966396+0.007064224018361598j)
3 Execution time: 0:00:37.481308 ovlp:
(0.999908799689919+0.008181427816854603j)

```

```

4 Execution time: 0:00:37.485258 ovlp:
(0.9998175993798379+0.014459049160767234j)
5 Execution time: 0:00:37.489739 ovlp:
(0.9997339990955969+0.014565449522528473j)
6 Execution time: 0:00:37.495211 ovlp:
(0.9996655988630361+0.014261448488924966j)
7 Execution time: 0:00:37.501164 ovlp:
(0.999384397906953+0.020060268204911802j)
8 Execution time: 0:00:37.507320 ovlp:
(0.9993159976743922+0.02367788050479369j)
9 Execution time: 0:00:37.515087 ovlp:
(0.9991487971059101+0.02569188735241701j)
10 Execution time: 0:00:37.523765 ovlp:
(0.9988979962531872+0.03060910407095374j)
11 Execution time: 0:00:37.532029 ovlp:
(0.9987155956330251+0.03003910213294736j)
12 Execution time: 0:00:37.541005 ovlp:
(0.9982975942118204+0.03502471908404492j)
13 Execution time: 0:00:37.550537 ovlp:
(0.9982443940309398+0.03661312448462328j)
14 Execution time: 0:00:37.560667 ovlp:
(0.9978263926097348+0.039622734717297936j)
15 Execution time: 0:00:37.571531 ovlp:
(0.9974691913952507+0.043240347017179825j)
16 Execution time: 0:00:37.584654 ovlp:
(0.9973019908267688+0.04488195259863881j)
17 Execution time: 0:00:37.596966 ovlp:
(0.9969447896122847+0.05033877115182195j)
18 Execution time: 0:00:37.609758 ovlp:
(0.996443187906839+0.05259597882632794j)
19 Execution time: 0:00:37.622938 ovlp:
(0.9958731859688323+0.05296078006665228j)
x_points = [np.float64(0.0), np.float64(0.024754224285904507),
np.float64(0.04950844857180901), np.float64(0.07426267285771351),
np.float64(0.09901689714361803), np.float64(0.12377112142952254),
np.float64(0.14852534571542703), np.float64(0.17327957000133154),
np.float64(0.19803379428723605), np.float64(0.22278801857314057),
np.float64(0.24754224285904508), np.float64(0.2722964671449496),
np.float64(0.29705069143085405), np.float64(0.32180491571675857),
np.float64(0.3465591400026631), np.float64(0.3713133642885676),
np.float64(0.3960675885744721), np.float64(0.4208218128603766),
np.float64(0.44557603714628113), np.float64(0.47033026143218565)]
y_points = [1. +0.j
1. +0.00334021135671869j
0.9999695998966396+0.0070642240183616j
0.999908799689919 +0.0081814278168546j
0.9998175993798379+0.01445904916076723j

```


0.9997339990955969+0.01456544952252847j
 0.9996655988630361+0.01426144848892497j
 0.999384397906953 +0.0200602682049118j
 0.9993159976743922+0.02367788050479369j
 0.9991487971059101+0.02569188735241701j
 0.9988979962531872+0.03060910407095374j
 0.9987155956330251+0.03003910213294736j
 0.9982975942118204+0.03502471908404492j
 0.9982443940309398+0.03661312448462328j
 0.9978263926097348+0.03962273471729794j
 0.9974691913952507+0.04324034701717983j
 0.9973019908267688+0.04488195259863881j
 0.9969447896122847+0.05033877115182195j
 0.996443187906839 +0.05259597882632794j
 0.9958731859688323+0.05296078006665228j]

fit1: [0.2782849868683757 -0.41865969766331734]
 [0.2782849868683757 -0.41865969766331734 0.2782949867683757
 -0.] 1.1379340714871527e-10
 [2.3965002681397832e-01 -3.6069724034049550e-01
 2.3958512140756827e-01
 -1.3671085877105421e-01 1.3932625154828953e-06]
 1.6774131556941813e-10
 E_gs: -0.3606972403404955

test mps sampling took: (0.0013289451599121094, Counter({0: 6, 2: 4}))
 truncated ham size: 12 Number of fitting points: 25
 shots per matrix element: 208333.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.26683789557225995

- 1 Execution time: 0:00:38.201624 ovlp:
(0.998828798126077+0.027537644060230404j)
- 2 Execution time: 0:00:38.203554 ovlp:
(0.9949407919052671+0.06041769666831476j)
- 3 Execution time: 0:00:38.206224 ovlp:
(0.9891711826738923+0.08925614280982841j)
- 4 Execution time: 0:00:38.209575 ovlp:
(0.9795327672524277+0.12103219365150975j)
- 5 Execution time: 0:00:38.213493 ovlp:
(0.9689151502642404+0.1518194429111086j)
- 6 Execution time: 0:00:38.218066 ovlp:
(0.9551391282226052+0.17777788444461518j)
- 7 Execution time: 0:00:38.223374 ovlp:
(0.9401439042302469+0.2094387351019762j)
- 8 Execution time: 0:00:38.229314 ovlp:
(0.9237374779799647+0.2313459701535523j)
- 9 Execution time: 0:00:38.236007 ovlp:
(0.9045278472445555+0.2531092049747279j)
- 10 Execution time: 0:00:38.243398 ovlp:

(0.883964614343383+0.27658124252998806j)

11 Execution time: 0:00:38.252475 ovlp:

(0.859743775590041+0.29521487234379573j)

12 Execution time: 0:00:38.262421 ovlp:

(0.8351485362376581+0.3167957068731311j)

13 Execution time: 0:00:38.272654 ovlp:

(0.8111676978683167+0.3279125246600394j)

14 Execution time: 0:00:38.283994 ovlp:

(0.7863324581319331+0.3415445464712743j)

15 Execution time: 0:00:38.296618 ovlp:

(0.7625532200851521+0.3484757575612121j)

16 Execution time: 0:00:38.308525 ovlp:

(0.7315259704415527+0.36602458563933693j)

17 Execution time: 0:00:38.320856 ovlp:

(0.7029659247454796+0.37148699437919097j)

18 Execution time: 0:00:38.333736 ovlp:

(0.6809722895556634+0.37219739551583286j)

19 Execution time: 0:00:38.347224 ovlp:

(0.6541882467011948+0.37742940388704627j)

20 Execution time: 0:00:38.361592 ovlp:

(0.6231993971190355+0.3759702015523225j)

21 Execution time: 0:00:38.376684 ovlp:

(0.6024633639413823+0.37386779818847704j)

22 Execution time: 0:00:38.392255 ovlp:

(0.5772153235445177+0.36986459178334696j)

23 Execution time: 0:00:38.408451 ovlp:

(0.5490488784782055+0.3667349867759788j)

24 Execution time: 0:00:38.427840 ovlp:

(0.5291672466675947+0.3556373690197905j)

x_points = [np.float64(0.0), np.float64(0.26683789557225995),

np.float64(0.5336757911445199), np.float64(0.8005136867167799),

np.float64(1.0673515822890398), np.float64(1.3341894778612997),

np.float64(1.6010273734335598), np.float64(1.8678652690058197),

np.float64(2.1347031645780796), np.float64(2.4015410601503397),

np.float64(2.6683789557225994), np.float64(2.9352168512948595),

np.float64(3.2020547468671197), np.float64(3.4688926424393793),

np.float64(3.7357305380116395), np.float64(4.0025684335839),

np.float64(4.269406329156159), np.float64(4.536244224728419),

np.float64(4.8030821203006795), np.float64(5.069920015872939),

np.float64(5.336757911445199), np.float64(5.603595807017459),

np.float64(5.870433702589719), np.float64(6.137271598161979),

np.float64(6.404109493734239)] y_points = [1. +0.j

0.998828798126077 +0.0275376440602304j

0.9949407919052671+0.06041769666831476j

0.9891711826738923+0.08925614280982841j

0.9795327672524277+0.12103219365150975j

0.9689151502642404+0.1518194429111086j

0.9551391282226052+0.17777788444461518j
 0.9401439042302469+0.2094387351019762j
 0.9237374779799647+0.2313459701535523j
 0.9045278472445555+0.2531092049747279j
 0.883964614343383 +0.27658124252998806j
 0.859743775590041 +0.29521487234379573j
 0.8351485362376581+0.3167957068731311j
 0.8111676978683167+0.3279125246600394j
 0.7863324581319331+0.3415445464712743j
 0.7625532200851521+0.3484757575612121j
 0.7315259704415527+0.36602458563933693j
 0.7029659247454796+0.37148699437919097j
 0.6809722895556634+0.37219739551583286j
 0.6541882467011948+0.37742940388704627j
 0.6231993971190355+0.3759702015523225j
 0.6024633639413823+0.37386779818847704j
 0.5772153235445177+0.36986459178334696j
 0.5490488784782055+0.3667349867759788j
 0.5291672466675947+0.3556373690197905j]
 fit1: [0.3778949953920855 -0.2926376729710368]
 [0.2917982388303509 -0.3397076057667765 0.37760194322968527
 -0.04686997730308438] 4.113454358735042e-09
 [0.28409617973284146 -0.34229663003864214 0.264590548023059
 -0.0686635919951982 -0.002932070204746] 3.63728951479439e-09
 E_gs: -0.34229663003864214
 test mps sampling took: (0.0012755393981933594, Counter({2: 6, 0: 4}))
 truncated ham size: 12 Number of fitting points: 15
 shots per matrix element: 357142.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.13334737089015594
 1 Execution time: 0:00:38.884537 ovlp:
 (0.9996919992607982+0.017701642483942015j)
 2 Execution time: 0:00:38.886443 ovlp:
 (0.998779197070073+0.028179267630242366j)
 3 Execution time: 0:00:38.889065 ovlp:
 (0.9973231935756646+0.04879291710300104j)
 4 Execution time: 0:00:38.892265 ovlp:
 (0.99480878754109+0.0654081569795768j)
 5 Execution time: 0:00:38.896295 ovlp:
 (0.992025580861394+0.07724098537836488j)
 6 Execution time: 0:00:38.900862 ovlp:
 (0.9887047728914549+0.09048501716404123j)
 7 Execution time: 0:00:38.906016 ovlp:
 (0.9848127635506325+0.10940186256447015j)
 8 Execution time: 0:00:38.912176 ovlp:
 (0.9806967536722089+0.1208370900090161j)
 9 Execution time: 0:00:38.918822 ovlp:

```

(0.9746543391704141+0.13431632235917368j)
10 Execution time: 0:00:38.927170  ovlp:
(0.9687631250315001+0.15033796081110595j)
11 Execution time: 0:00:38.936483  ovlp:
(0.9625583101399444+0.16409719383326515j)
12 Execution time: 0:00:38.945391  ovlp:
(0.9556758936221448+0.1815468357124057j)
13 Execution time: 0:00:38.955033  ovlp:
(0.948614276674264+0.18947645474349128j)
14 Execution time: 0:00:38.965109  ovlp:
(0.9393126543503705+0.2046188910853386j)
x_points = [np.float64(0.0), np.float64(0.13334737089015594),
np.float64(0.2666947417803119), np.float64(0.40004211267046785),
np.float64(0.5333894835606238), np.float64(0.6667368544507797),
np.float64(0.8000842253409357), np.float64(0.9334315962310916),
np.float64(1.0667789671212475), np.float64(1.2001263380114036),
np.float64(1.3334737089015594), np.float64(1.4668210797917154),
np.float64(1.6001684506818714), np.float64(1.7335158215720272),
np.float64(1.8668631924621832)] y_points = [1.          +0.j
0.9996919992607982+0.01770164248394202j
0.998779197070073 +0.02817926763024237j
0.9973231935756646+0.04879291710300104j
0.99480878754109  +0.0654081569795768j
0.992025580861394 +0.07724098537836488j
0.9887047728914549+0.09048501716404123j
0.9848127635506325+0.10940186256447015j
0.9806967536722089+0.1208370900090161j
0.9746543391704141+0.13431632235917368j
0.9687631250315001+0.15033796081110595j
0.9625583101399444+0.16409719383326515j
0.9556758936221448+0.1815468357124057j
0.948614276674264 +0.18947645474349128j
0.9393126543503705+0.2046188910853386j ]
fit1: [ 0.38018942081183615 -0.30588393824981325]
[ 0.38018942081183615 -0.30588393824981325  0.38019942071183616
-0.          ] 2.4689158250810816e-10
[ 2.5344549610249328e-01 -3.6609033727458723e-01
2.9525227761313755e-01
-8.1929639461066531e-02  5.8059671666715977e-06]
2.2275350311738633e-10
E_gs: -0.36609033727458723
test mps sampling took: (0.0012521743774414062, Counter({2: 6, 0: 4}))
truncated ham size: 12  Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.2117935366116722
1 Execution time: 0:00:39.416971  ovlp:

```

```

(0.9991959996783999+0.024548409819364014j)
2 Execution time: 0:00:39.418839 ovlp:
(0.9970407988163195+0.04682521873008749j)
3 Execution time: 0:00:39.421363 ovlp:
(0.992852797141119+0.07470122988049188j)
4 Execution time: 0:00:39.424612 ovlp:
(0.987685595074238+0.09685323874129548j)
5 Execution time: 0:00:39.429087 ovlp:
(0.9804807921923169+0.12277804911121959j)
6 Execution time: 0:00:39.434971 ovlp:
(0.9720207888083154+0.14504765801906316j)
x_points = [np.float64(0.0), np.float64(0.2117935366116722),
np.float64(0.4235870732233444), np.float64(0.6353806098350165),
np.float64(0.8471741464466888), np.float64(1.058967683058361),
np.float64(1.270761219670033)] y_points = [1.          +0.j
0.9991959996783999+0.02454840981936401j
0.9970407988163195+0.04682521873008749j
0.992852797141119 +0.07470122988049188j
0.987685595074238 +0.09685323874129548j
0.9804807921923169+0.12277804911121959j
0.9720207888083154+0.14504765801906316j]
fit1: [ 0.36537107018448656 -0.31802143315106446]
[ 0.36537107018448656 -0.31802143315106446 0.36538107008448656
-0.          ] 3.7162079105657016e-11
[ 3.002804122129516e-01 -3.004067730605164e-01
3.024234072468309e-01
-9.050828195013136e-02 2.130640678843560e-06]
3.3147035859252194e-10
E_gs: -0.3004067730605164
test mps sampling took: (0.0012919902801513672, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2603545541406873
1 Execution time: 0:00:40.131411 ovlp:
(0.9988919999999999+0.030381999999999991j)
2 Execution time: 0:00:40.133412 ovlp:
(0.995312+0.062526000000000008j)
3 Execution time: 0:00:40.136227 ovlp:
(0.989338+0.089042000000000007j)
4 Execution time: 0:00:40.140250 ovlp:
(0.9810000000000001+0.1183240000000001j)
5 Execution time: 0:00:40.144570 ovlp:
(0.9704379999999999+0.14849200000000007j)
x_points = [np.float64(0.0), np.float64(0.2603545541406873),
np.float64(0.5207091082813746), np.float64(0.7810636624220619),
np.float64(1.0414182165627492), np.float64(1.3017727707034366)] y_points

```

```

= [1.          +0.j
 0.9988919999999999+0.03038199999999991j
 0.995312        +0.062526000000000008j
 0.989338        +0.089042000000000007j
 0.9810000000000001+0.11832400000000001j
 0.9704379999999999+0.14849200000000007j]
fit1: [ 0.35955923830228553 -0.3262965547367348 ]
[ 0.35955923830228553 -0.3262965547367348  0.35956923820228553
 -0.          ] 3.943019471652036e-11
[ 2.8498799881096037e-01 -3.3610305810306029e-01
 2.8677566727798637e-01
 -7.3700057584672685e-02  2.9757619551898918e-06]
1.468116458444677e-11
E_gs: -0.3361030581030603
test mps sampling took: (0.001325368881225586, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.0813293042485298
1 Execution time: 0:00:40.741493 ovlp:
(0.9998435996559192+0.007864217301277954j)
2 Execution time: 0:00:40.743376 ovlp:
(0.9994899988779975+0.020471445037179015j)
3 Execution time: 0:00:40.746494 ovlp:
(0.998986797770955+0.029297864455301692j)
4 Execution time: 0:00:40.749968 ovlp:
(0.9982727962001516+0.039164686162309614j)
5 Execution time: 0:00:40.754312 ovlp:
(0.997096393612066+0.044727098399616416j)
6 Execution time: 0:00:40.759511 ovlp:
(0.9957839907247796+0.0558859229490305j)
7 Execution time: 0:00:40.765017 ovlp:
(0.9944919878823733+0.06829595025109048j)
8 Execution time: 0:00:40.771120 ovlp:
(0.9923839832447632+0.07244395937671055j)
9 Execution time: 0:00:40.778737 ovlp:
(0.9901331782929923+0.08653359037389885j)
10 Execution time: 0:00:40.787291 ovlp:
(0.9877123729672206+0.09616921157226543j)
11 Execution time: 0:00:40.795987 ovlp:
(0.9858763689280117+0.10243882536541582j)
12 Execution time: 0:00:40.805041 ovlp:
(0.9831291628841583+0.11395805070771159j)
13 Execution time: 0:00:40.815521 ovlp:
(0.9801439563167038+0.12022766450086197j)
14 Execution time: 0:00:40.826589 ovlp:
(0.9772811500185301+0.1304820870605916j)

```

```

15 Execution time: 0:00:40.837865  ovlp:
(0.97312634087795+0.14007690816919793j)
16 Execution time: 0:00:40.849788  ovlp:
(0.9702839346246561+0.1465505224111494j)
17 Execution time: 0:00:40.861920  ovlp:
(0.9656667244667938+0.15558774229303296j)
x_points = [np.float64(0.0), np.float64(0.0813293042485298),
np.float64(0.1626586084970596), np.float64(0.2439879127455894),
np.float64(0.3253172169941192), np.float64(0.406646521242649),
np.float64(0.4879758254911788), np.float64(0.5693051297397086),
np.float64(0.6506344339882384), np.float64(0.7319637382367682),
np.float64(0.813293042485298), np.float64(0.8946223467338278),
np.float64(0.9759516509823576), np.float64(1.0572809552308873),
np.float64(1.1386102594794172), np.float64(1.219939563727947),
np.float64(1.3012688679764768), np.float64(1.3825981722250065)] y_points
= [1.          +0.j
0.9998435996559192+0.00786421730127795j
0.9994899988779975+0.02047144503717901j
0.998986797770955 +0.02929786445530169j
0.9982727962001516+0.03916468616230961j
0.997096393612066 +0.04472709839961642j
0.9957839907247796+0.0558859229490305j
0.9944919878823733+0.06829595025109048j
0.9923839832447632+0.07244395937671055j
0.9901331782929923+0.08653359037389885j
0.9877123729672206+0.09616921157226543j
0.9858763689280117+0.10243882536541582j
0.9831291628841583+0.11395805070771159j
0.9801439563167038+0.12022766450086197j
0.9772811500185301+0.1304820870605916j
0.97312634087795  +0.14007690816919793j
0.9702839346246561+0.1465505224111494j
0.9656667244667938+0.15558774229303296j]
fit1: [ 0.372816116994647 -0.3127837063206462]
[ 0.372816116994647 -0.3127837063206462  0.372826116894647
-0.          ] 1.1222183248475953e-10
[ 2.7942903725254681e-01 -3.4643386759008205e-01
2.8390811149574696e-01
-7.0195104690299284e-02  3.0594643806180504e-06]
1.2310260588275104e-10
E_gs: -0.34643386759008205
test mps sampling took: (0.0013210773468017578, Counter({2: 8, 0: 2}))
truncated ham size: 12  Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.23732278469859897
1 Execution time: 0:00:41.364030  ovlp:

```

```

(0.9989399999999999+0.024167999999999967j)
2 Execution time: 0:00:41.365982  ovlp:
(0.9960119999999999+0.0524039999999999895j)
3 Execution time: 0:00:41.368697  ovlp:
(0.9910399999999999+0.08372399999999991j)
4 Execution time: 0:00:41.371974  ovlp: (0.98462+0.10919199999999996j)
5 Execution time: 0:00:41.375902  ovlp:
(0.975932+0.135248000000000003j)
6 Execution time: 0:00:41.380864  ovlp:
(0.964488+0.160015999999999994j)
7 Execution time: 0:00:41.386379  ovlp:
(0.952564+0.187775999999999994j)
8 Execution time: 0:00:41.392501  ovlp:
(0.9377759999999999+0.2076119999999999j)
9 Execution time: 0:00:41.399230  ovlp: (0.9236+0.23031599999999997j)
10 Execution time: 0:00:41.406629  ovlp:
(0.90615200000000001+0.25084799999999996j)
x_points = [np.float64(0.0), np.float64(0.23732278469859897),
np.float64(0.47464556939719793), np.float64(0.7119683540957968),
np.float64(0.9492911387943959), np.float64(1.1866139234929949),
np.float64(1.4239367081915937), np.float64(1.6612594928901927),
np.float64(1.8985822775887917), np.float64(2.1359050622873905),
np.float64(2.3732278469859898)] y_points = [1.          +0.j
0.9989399999999999+0.02416799999999997j
0.9960119999999999+0.0524039999999999j
0.9910399999999999+0.08372399999999991j
0.98462          +0.10919199999999996j
0.975932          +0.13524800000000003j
0.964488          +0.160015999999999994j
0.952564          +0.187775999999999994j
0.9377759999999999+0.2076119999999999j
0.9236          +0.23031599999999997j
0.90615200000000001+0.25084799999999996j]
fit1: [ 0.388054158577548 -0.2995465635954424]
[ 0.388054158577548 -0.2995465635954424 0.388064158477548
-0.          ] 1.3699135242472045e-10
[ 3.0896062222769183e-01 -3.3322624769135345e-01
3.0554727541668220e-01
-4.5700998360530605e-02 3.4758609855676013e-06]
1.4468677411043694e-10
E_gs: -0.33322624769135345
test mps sampling took: (0.001287221908569336, Counter({0: 7, 2: 3}))
truncated ham size: 12  Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.01926705561697062
1 Execution time: 0:00:41.933585  ovlp: (1+0.0032890032890033893j)

```



```

2 Execution time: 0:00:41.935556  ovlp:
(0.9999843999844+0.005239005239005223j)
3 Execution time: 0:00:41.938235  ovlp:
(0.9999531999531999+0.00724100724100718j)
4 Execution time: 0:00:41.941631  ovlp:
(0.9999115999116+0.009601809601809563j)
5 Execution time: 0:00:41.945627  ovlp:
(0.9998491998491998+0.01136461136461131j)
6 Execution time: 0:00:41.950213  ovlp:
(0.9997607997607998+0.016564616564616497j)
7 Execution time: 0:00:41.955611  ovlp:
(0.9996255996255996+0.01320541320541313j)
8 Execution time: 0:00:41.961595  ovlp:
(0.9995787995787995+0.020163020163020073j)
9 Execution time: 0:00:41.969389  ovlp:
(0.9994695994695995+0.020459420459420397j)
10 Execution time: 0:00:41.978020  ovlp:
(0.9993967993967994+0.021977821977821943j)
11 Execution time: 0:00:41.986212  ovlp:
(0.9993187993187993+0.02005382005382006j)
12 Execution time: 0:00:41.996462  ovlp:
(0.9990847990847991+0.027058227058227136j)
13 Execution time: 0:00:42.007767  ovlp:
(0.998902798902799+0.029159029159029126j)
x_points = [np.float64(0.0), np.float64(0.01926705561697062),
np.float64(0.03853411123394124), np.float64(0.057801166850911856),
np.float64(0.07706822246788247), np.float64(0.0963352780848531),
np.float64(0.11560233370182371), np.float64(0.13486938931879433),
np.float64(0.15413644493576495), np.float64(0.17340350055273557),
np.float64(0.1926705561697062), np.float64(0.2119376117866768),
np.float64(0.23120466740364742), np.float64(0.25047172302061804)]
y_points = [1.          +0.j
1.          +0.00328900328900339j
0.9999843999844  +0.00523900523900522j
0.9999531999531999+0.00724100724100718j
0.9999115999116  +0.00960180960180956j
0.9998491998491998+0.01136461136461131j
0.9997607997607998+0.0165646165646165j
0.9996255996255996+0.01320541320541313j
0.9995787995787995+0.02016302016302007j
0.9994695994695995+0.0204594204594204j
0.9993967993967994+0.02197782197782194j
0.9993187993187993+0.02005382005382006j
0.9990847990847991+0.02705822705822714j
0.998902798902799 +0.02915902915902913j]
fit1: [ 0.4742600202927844 -0.2370820445508246]
[ 0.4742600202927844 -0.2370820445508246  0.4742700201927844

```

```

-0.          ] 2.2508420088397665e-10
[ 4.1053314808337071e-01 -2.0510775558383437e-01
4.1067840388835841e-01
-7.3014293877359318e-02  1.3389333439284040e-06]
2.476717299563813e-10
E_gs: -0.20510775558383437
test mps sampling took: (0.01978445053100586, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.17491392416731327
1 Execution time: 0:00:42.296430  ovlp:
(0.99946959978784+0.020545208218083255j)
2 Execution time: 0:00:42.298388  ovlp:
(0.9977943991177596+0.04018681607472652j)
3 Execution time: 0:00:42.301107  ovlp:
(0.9952407980963192+0.05942042376816947j)
4 Execution time: 0:00:42.304466  ovlp:
(0.9913191965276786+0.08197563279025322j)
5 Execution time: 0:00:42.308395  ovlp:
(0.986696794678718+0.09906843962737577j)
6 Execution time: 0:00:42.312878  ovlp:
(0.980821592328637+0.12004204801681917j)
x_points = [np.float64(0.0), np.float64(0.17491392416731327),
np.float64(0.34982784833462655), np.float64(0.5247417725019399),
np.float64(0.6996556966692531), np.float64(0.8745696208365663),
np.float64(1.0494835450038797)] y_points = [1.          +0.j
0.99946959978784  +0.02054520821808326j
0.9977943991177596+0.04018681607472652j
0.9952407980963192+0.05942042376816947j
0.9913191965276786+0.08197563279025322j
0.986696794678718 +0.09906843962737577j
0.980821592328637 +0.12004204801681917j]
fit1: [ 0.4487984683084645 -0.25986149074497433]
[ 0.4487984683084645 -0.25986149074497433  0.4488084682084645
-0.          ] 6.132200163410077e-11
[ 3.4443392003443457e-01 -2.8726090927763248e-01
3.3659283793827283e-01
-5.3065501877709718e-02  2.8914608017854653e-06]
1.093862581964664e-10
E_gs: -0.2872609092776325
test mps sampling took: (0.0012736320495605469, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.0714896900931355
1 Execution time: 0:00:43.110276  ovlp:

```

```

(0.999924+0.0072900000000000019j)
2 Execution time: 0:00:43.112517  ovlp:
(0.999632000000000001+0.016672000000000002j)
3 Execution time: 0:00:43.115486  ovlp:
(0.99919+0.02569200000000000048j)
4 Execution time: 0:00:43.119057  ovlp:
(0.998606000000000001+0.0328980000000000094j)
5 Execution time: 0:00:43.124083  ovlp:
(0.997746+0.0408260000000000003j)
x_points = [np.float64(0.0), np.float64(0.0714896900931355),
np.float64(0.142979380186271), np.float64(0.21446907027940648),
np.float64(0.285958760372542), np.float64(0.35744845046567747)]
y_points = [1.          +0.j
0.999924          +0.0072900000000000002j
0.999632000000000001+0.016672000000000002j
0.99919          +0.0256920000000000005j
0.998606000000000001+0.0328980000000000009j
0.997746          +0.0408260000000000003j]
fit1: [ 0.2836072737214494 -0.4253847764011978]
[ 0.2836072737214494 -0.4253847764011978  0.2836172736214494
 -0.          ] 2.1114886404962194e-11
[ 2.4310348904289292e-01 -3.6464987074783661e-01
 2.4310996590232761e-01
 -1.5059295501697501e-01  1.4280705550595277e-06]
1.5040947266933137e-10
E_gs: -0.3646498707478366
test mps sampling took: (0.0012810230255126953, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1516751462050177
1 Execution time: 0:00:43.516716  ovlp:
(0.9995511990126378+0.017425038335084242j)
2 Execution time: 0:00:43.518567  ovlp:
(0.9984359965591925+0.03554707820357206j)
3 Execution time: 0:00:43.521254  ovlp:
(0.9962667917869419+0.05483192063022546j)
4 Execution time: 0:00:43.524402  ovlp:
(0.9935603858328488+0.07569436652760642j)
5 Execution time: 0:00:43.528262  ovlp:
(0.9895415769914693+0.08916519616343166j)
6 Execution time: 0:00:43.532662  ovlp:
(0.9858219688083314+0.10949724089392987j)
7 Execution time: 0:00:43.537858  ovlp:
(0.9799195558230227+0.11984006364814004j)
8 Execution time: 0:00:43.545156  ovlp:
(0.9736295419849923+0.13579289874437728j)

```

```

9 Execution time: 0:00:43.552129 ovlp:
(0.9667683268903191+0.15472414039310878j)
10 Execution time: 0:00:43.559380 ovlp:
(0.9601791123940473+0.168181369999014j)
11 Execution time: 0:00:43.567266 ovlp:
(0.9517606938735266+0.18197180033796068j)
12 Execution time: 0:00:43.579403 ovlp:
(0.9434578756073264+0.1988630374986824j)
13 Execution time: 0:00:43.590779 ovlp:
(0.9344138557104826+0.2161690755719663j)
14 Execution time: 0:00:43.602761 ovlp:
(0.9241118330460327+0.23102030824467823j)
15 Execution time: 0:00:43.613631 ovlp:
(0.9133950094690209+0.2434167355168182j)
16 Execution time: 0:00:43.624969 ovlp:
(0.9025693856526484+0.2548135605898334j)
17 Execution time: 0:00:43.639267 ovlp:
(0.8908801599363518+0.2674343883556545j)
x_points = [np.float64(0.0), np.float64(0.1516751462050177),
np.float64(0.3033502924100354), np.float64(0.4550254386150531),
np.float64(0.6067005848200708), np.float64(0.7583757310250885),
np.float64(0.9100508772301062), np.float64(1.061726023435124),
np.float64(1.2134011696401417), np.float64(1.3650763158451593),
np.float64(1.516751462050177), np.float64(1.6684266082551948),
np.float64(1.8201017544602125), np.float64(1.9717769006652301),
np.float64(2.123452046870248), np.float64(2.2751271930752655),
np.float64(2.4268023392802833), np.float64(2.578477485485301)] y_points
= [1.          +0.j
0.9995511990126378+0.01742503833508424j
0.9984359965591925+0.03554707820357206j
0.9962667917869419+0.05483192063022546j
0.9935603858328488+0.07569436652760642j
0.9895415769914693+0.08916519616343166j
0.9858219688083314+0.10949724089392987j
0.9799195558230227+0.11984006364814004j
0.9736295419849923+0.13579289874437728j
0.9667683268903191+0.15472414039310878j
0.9601791123940473+0.168181369999014j
0.9517606938735266+0.18197180033796068j
0.9434578756073264+0.1988630374986824j
0.9344138557104826+0.2161690755719663j
0.9241118330460327+0.23102030824467823j
0.9133950094690209+0.2434167355168182j
0.9025693856526484+0.2548135605898334j
0.8908801599363518+0.2674343883556545j ]
fit1: [ 0.38374498180211164 -0.3026950258210002 ]
[ 0.38374498180211164 -0.3026950258210002  0.38375498170211164

```

```

-0.          ] 1.073009348693257e-09
[ 2.6522479829321555e-01 -3.5728128661836800e-01
2.9271448129437661e-01
-7.6276093882164955e-02 2.8375075525978158e-06]
7.681505630593419e-10
E_gs: -0.357281286618368
test mps sampling took: (0.001271963119506836, Counter({2: 8, 0: 2}))
truncated ham size: 12 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.09859162406232382
1 Execution time: 0:00:44.098431 ovlp:
(0.999824+0.010752000000000095j)
2 Execution time: 0:00:44.100371 ovlp:
(0.99928400000000001+0.022591999999999995j)
3 Execution time: 0:00:44.103005 ovlp:
(0.9983839999999999+0.031555999999999992j)
4 Execution time: 0:00:44.106109 ovlp:
(0.997328+0.0442480000000000065j)
5 Execution time: 0:00:44.109969 ovlp:
(0.99564000000000001+0.055708000000000009j)
6 Execution time: 0:00:44.114709 ovlp:
(0.9938039999999999+0.065244000000000008j)
7 Execution time: 0:00:44.120558 ovlp: (0.99142+0.079107999999999996j)
8 Execution time: 0:00:44.129425 ovlp: (0.989088+0.08925999999999999j)
9 Execution time: 0:00:44.136991 ovlp: (0.98624+0.10124j)
10 Execution time: 0:00:44.144216 ovlp:
(0.9825919999999999+0.113183999999999995j)
x_points = [np.float64(0.0), np.float64(0.09859162406232382),
np.float64(0.19718324812464763), np.float64(0.29577487218697146),
np.float64(0.39436649624929526), np.float64(0.49295812031161906),
np.float64(0.5915497443739429), np.float64(0.6901413684362667),
np.float64(0.7887329924985905), np.float64(0.8873246165609143),
np.float64(0.9859162406232381)] y_points = [1.          +0.j
0.999824          +0.010752000000000095j
0.99928400000000001+0.022591999999999995j
0.9983839999999999+0.031555999999999992j
0.997328          +0.044248000000000007j
0.99564000000000001+0.055708000000000009j
0.9938039999999999+0.065244000000000008j
0.99142          +0.079107999999999996j
0.989088          +0.08925999999999999j
0.98624          +0.10124j
0.9825919999999999+0.113183999999999995j]
fit1: [ 0.33568386798944216 -0.3420862058635085 ]
[ 0.33568386798944216 -0.3420862058635085 0.33569386788944217
-0.          ] 5.989323566283245e-11

```

```

[ 2.7147941549949811e-01 -3.0688677447263762e-01
 2.8234926107514163e-01
 -1.1495255448146340e-01  2.4995704547067867e-06]
1.6963314109642345e-10
E_gs: -0.3068867744726376
test mps sampling took: (0.0013508796691894531, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.04101902306405466
1 Execution time: 0:00:44.899391 ovlp:
(0.9999743999999999+0.00241280000000001038j)
2 Execution time: 0:00:44.902010 ovlp:
(0.9998688+0.00999360000000000047j)
3 Execution time: 0:00:44.904779 ovlp:
(0.9997343999999999+0.013497599999999998j)
4 Execution time: 0:00:44.908148 ovlp:
(0.9995456+0.02007040000000000044j)
5 Execution time: 0:00:44.912038 ovlp:
(0.99930880000000001+0.0242560000000000055j)
6 Execution time: 0:00:44.917202 ovlp:
(0.9988256+0.029683200000000002j)
7 Execution time: 0:00:44.923577 ovlp:
(0.9984767999999999+0.032396799999999989j)
8 Execution time: 0:00:44.930642 ovlp:
(0.9981408+0.037740799999999991j)
x_points = [np.float64(0.0), np.float64(0.04101902306405466),
np.float64(0.08203804612810932), np.float64(0.12305706919216397),
np.float64(0.16407609225621864), np.float64(0.2050951153202733),
np.float64(0.24611413838432794), np.float64(0.28713316144838263),
np.float64(0.3281521845124373)] y_points = [1.          +0.j
0.9999743999999999+0.00241280000000001j
0.9998688          +0.0099936000000000005j
0.9997343999999999+0.0134976j
0.9995456          +0.0200704000000000004j
0.99930880000000001+0.024256000000000006j
0.9988256          +0.029683200000000002j
0.9984767999999999+0.032396799999999989j
0.9981408          +0.037740799999999991j]
fit1: [ 0.28358473751925417 -0.425649700188709 ]
[ 0.28358473751925417 -0.425649700188709  0.2835947374192542
 -0.          ] 4.28634238683566e-11
[ 2.4518612182208302e-01 -3.6803802110061545e-01
 2.4518867666991234e-01
 -1.4320450407335600e-01  1.3542743560648006e-06]
1.774205060670511e-10
E_gs: -0.36803802110061545

```

```

test mps sampling took: (0.001352548599243164, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1299243309257358
1 Execution time: 0:00:45.270627 ovlp:
(0.99971000000000001+0.016526000000000004j)
2 Execution time: 0:00:45.272506 ovlp:
(0.99884+0.0288939999999999975j)
3 Execution time: 0:00:45.275023 ovlp:
(0.99723000000000001+0.046456000000000005j)
4 Execution time: 0:00:45.278264 ovlp:
(0.99525599999999999+0.0606539999999999986j)
5 Execution time: 0:00:45.282102 ovlp:
(0.992596+0.074764000000000005j)
x_points = [np.float64(0.0), np.float64(0.1299243309257358),
np.float64(0.2598486618514716), np.float64(0.3897729927772074),
np.float64(0.5196973237029432), np.float64(0.649621654628679)] y_points
= [1.          +0.j
0.99971000000000001+0.016526000000000004j
0.99884          +0.028893999999999998j
0.99723000000000001+0.046456000000000005j
0.99525599999999999+0.060653999999999999j
0.992596         +0.074764000000000005j]
fit1: [ 0.4886106527409995 -0.24427378168715772]
[ 0.4886106527409995 -0.24427378168715772 0.4886206526409995
-0.          ] 4.145679723190043e-11
[ 4.2166263011911687e-01 -2.1088430477228473e-01
4.2159067714093879e-01
-7.2534105335734497e-02 1.3725338265710686e-06]
1.5762185706721336e-10
E_gs: -0.21088430477228473
test mps sampling took: (0.0012946128845214844, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.09361715341897972
1 Execution time: 0:00:45.759544 ovlp:
(0.9998387998387999+0.011401011401011463j)
2 Execution time: 0:00:45.761449 ovlp:
(0.9993187993187993+0.021161421161421057j)
3 Execution time: 0:00:45.764597 ovlp:
(0.9985803985803985+0.034613834613834715j)
4 Execution time: 0:00:45.768074 ovlp:
(0.9975247975247976+0.04490984490984484j)
5 Execution time: 0:00:45.772365 ovlp:
(0.996131196131196+0.055949455949455995j)

```

```

6 Execution time: 0:00:45.776973  ovlp:
(0.9947063947063948+0.06388986388986395j)
7 Execution time: 0:00:45.782341  ovlp:
(0.9924495924495924+0.07606827606827604j)
8 Execution time: 0:00:45.788115  ovlp:
(0.99000559000559+0.08896428896428898j)
9 Execution time: 0:00:45.795356  ovlp:
(0.9875147875147876+0.09945269945269941j)
10 Execution time: 0:00:45.802854  ovlp:
(0.9849511849511849+0.10576030576030582j)
11 Execution time: 0:00:45.810711  ovlp:
(0.981082381082381+0.11811031811031802j)
12 Execution time: 0:00:45.819040  ovlp:
(0.977988377988378+0.125931125931126j)
13 Execution time: 0:00:45.829235  ovlp:
(0.974046774046774+0.13725153725153727j)
x_points = [np.float64(0.0), np.float64(0.09361715341897972),
np.float64(0.18723430683795944), np.float64(0.2808514602569392),
np.float64(0.3744686136759189), np.float64(0.4680857670948986),
np.float64(0.5617029205138784), np.float64(0.6553200739328581),
np.float64(0.7489372273518378), np.float64(0.8425543807708175),
np.float64(0.9361715341897971), np.float64(1.029788687608777),
np.float64(1.1234058410277568), np.float64(1.2170229944467363)] y_points
= [1.          +0.j
0.9998387998387999+0.01140101140101146j
0.9993187993187993+0.02116142116142106j
0.9985803985803985+0.03461383461383472j
0.9975247975247976+0.04490984490984484j
0.996131196131196 +0.055949455949456j
0.9947063947063948+0.06388986388986395j
0.9924495924495924+0.07606827606827604j
0.99000559000559 +0.08896428896428898j
0.9875147875147876+0.09945269945269941j
0.9849511849511849+0.10576030576030582j
0.981082381082381 +0.11811031811031802j
0.977988377988378 +0.125931125931126j
0.974046774046774 +0.13725153725153727j]
fit1: [ 0.3745052301262039 -0.310714225753943 ]
[ 0.3745052301262039 -0.310714225753943  0.3745152300262039
-0.          ] 7.679052139843068e-11
[ 2.9563877303182157e-01 -3.3204574871628290e-01
2.8738486461057988e-01
-6.5039097471995169e-02  2.9043346479354796e-06]
9.48496964067155e-11
E_gs: -0.3320457487162829
test mps sampling took: (0.001415252685546875, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 21

```


shots per matrix element: 250000.0

Total gate count: 224 2 qubit gates: 120

N gate: 224 dt: 0.20702567747502484

1 Execution time: 0:00:46.320877 ovlp:

(0.999144+0.026135999999999937j)

2 Execution time: 0:00:46.322930 ovlp:

(0.9970239999999999+0.04901599999999995j)

3 Execution time: 0:00:46.325655 ovlp:

(0.993144+0.07397600000000004j)

4 Execution time: 0:00:46.328802 ovlp:

(0.987784+0.09798400000000007j)

5 Execution time: 0:00:46.333336 ovlp:

(0.9814879999999999+0.11783199999999994j)

6 Execution time: 0:00:46.338139 ovlp:

(0.9730559999999999+0.14337599999999995j)

7 Execution time: 0:00:46.345194 ovlp:

(0.963792+0.16065599999999999j)

8 Execution time: 0:00:46.351404 ovlp:

(0.9521360000000001+0.1843840000000001j)

9 Execution time: 0:00:46.357813 ovlp:

(0.9401280000000001+0.2034800000000001j)

10 Execution time: 0:00:46.365712 ovlp:

(0.927352+0.22675200000000006j)

11 Execution time: 0:00:46.374623 ovlp:

(0.9130320000000001+0.24199199999999998j)

12 Execution time: 0:00:46.385029 ovlp:

(0.8971119999999999+0.2594559999999999j)

13 Execution time: 0:00:46.396107 ovlp:

(0.8804719999999999+0.277288j)

14 Execution time: 0:00:46.406562 ovlp:

(0.8617520000000001+0.2945279999999999j)

15 Execution time: 0:00:46.417297 ovlp:

(0.8433520000000001+0.30757600000000007j)

16 Execution time: 0:00:46.430879 ovlp: (0.826208+0.317736j)

17 Execution time: 0:00:46.444723 ovlp: (0.805768+0.330128j)

18 Execution time: 0:00:46.457543 ovlp: (0.785784+0.3415760000000001j)

19 Execution time: 0:00:46.472405 ovlp: (0.76528+0.3542160000000001j)

20 Execution time: 0:00:46.489241 ovlp:

(0.74444+0.35919999999999996j)

x_points = [np.float64(0.0), np.float64(0.20702567747502484),

np.float64(0.4140513549500497), np.float64(0.6210770324250745),

np.float64(0.8281027099000994), np.float64(1.0351283873751242),

np.float64(1.242154064850149), np.float64(1.449179742325174),

np.float64(1.6562054198001988), np.float64(1.8632310972752235),

np.float64(2.0702567747502485), np.float64(2.2772824522252733),

np.float64(2.484308129700298), np.float64(2.691333807175323),

np.float64(2.898359484650348), np.float64(3.1053851621253727),

np.float64(3.3124108396003975), np.float64(3.5194365170754223),

```

np.float64(3.726462194550447), np.float64(3.9334878720254722),
np.float64(4.140513549500497)] y_points = [1.          +0.j
0.999144          +0.026135999999999994j
0.9970239999999999+0.049015999999999995j
0.993144          +0.073976000000000004j
0.987784          +0.097984000000000007j
0.9814879999999999+0.117831999999999994j
0.9730559999999999+0.143375999999999995j
0.963792          +0.16065599999999999j
0.9521360000000001+0.18438400000000001j
0.9401280000000001+0.20348000000000001j
0.927352          +0.226752000000000006j
0.9130320000000001+0.241991999999999998j
0.8971119999999999+0.25945599999999999j
0.8804719999999999+0.277288j
0.8617520000000001+0.29452799999999999j
0.8433520000000001+0.307576000000000007j
0.826208          +0.317736j
0.805768          +0.330128j
0.785784          +0.34157600000000001j
0.76528           +0.35421600000000001j
0.74444           +0.359199999999999996j]
fit1: [ 0.3817403755413992 -0.30058240136619024]
[ 0.3258226002552502 -0.32636003113152035 0.3791075638488911
-0.02646254548137055] 2.03236108421526e-10
[ 0.2884578250538884 -0.3443982404322403 0.27649116276374647
-0.0608662273686364 -0.00205857982704106] 2.29070258969122e-10
E_gs: -0.3443982404322403
test mps sampling took: (0.0013706684112548828, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.15341477112255147
1 Execution time: 0:00:46.870319 ovlp:
(0.9996503988113559+0.017825860607926014j)
2 Execution time: 0:00:46.872423 ovlp:
(0.9981987938758992+0.036765125001424925j)
3 Execution time: 0:00:46.875165 ovlp:
(0.9961467868990754+0.05396398347754383j)
4 Execution time: 0:00:46.878321 ovlp:
(0.9935019779067249+0.07240164616559697j)
5 Execution time: 0:00:46.882127 ovlp:
(0.9899223657360434+0.08898490254866864j)
6 Execution time: 0:00:46.886649 ovlp:
(0.9855067507229525+0.10544655851829887j)
7 Execution time: 0:00:46.892117 ovlp:
(0.9793887299216817+0.12315461872570377j)

```

```

8 Execution time: 0:00:46.899192  ovlp:
(0.9737571107741767+0.139616274695334j)
9 Execution time: 0:00:46.906678  ovlp:
(0.9678670907481086+0.15591833012232237j)
10 Execution time: 0:00:46.914731  ovlp:
(0.9593094616521696+0.17577719764247202j)
11 Execution time: 0:00:46.924881  ovlp:
(0.9515194351660796+0.18777003841813067j)
12 Execution time: 0:00:46.934075  ovlp:
(0.942467804390535+0.19759687182936414j)
13 Execution time: 0:00:46.943315  ovlp:
(0.9320481689637745+0.21454492945276016j)
14 Execution time: 0:00:46.953139  ovlp:
(0.9214841330460524+0.2349965989884366j)
15 Execution time: 0:00:46.964788  ovlp:
(0.912455302348028+0.24552263477695835j)
16 Execution time: 0:00:46.976333  ovlp:
(0.9008652629418941+0.25800187720638257j)
17 Execution time: 0:00:46.990123  ovlp:
(0.8861516129154838+0.2705419198425274j)
18 Execution time: 0:00:47.003385  ovlp:
(0.8756939773595229+0.28191155849929883j)
19 Execution time: 0:00:47.020148  ovlp:
(0.8631463346975379+0.2927719954247845j)
x_points = [np.float64(0.0), np.float64(0.15341477112255147),
np.float64(0.30682954224510295), np.float64(0.4602443133676544),
np.float64(0.6136590844902059), np.float64(0.7670738556127574),
np.float64(0.9204886267353088), np.float64(1.0739033978578603),
np.float64(1.2273181689804118), np.float64(1.3807329401029633),
np.float64(1.5341477112255149), np.float64(1.6875624823480662),
np.float64(1.8409772534706177), np.float64(1.9943920245931692),
np.float64(2.1478067957157205), np.float64(2.3012215668382723),
np.float64(2.4546363379608236), np.float64(2.608051109083375),
np.float64(2.7614658802059266), np.float64(2.914880651328478)] y_points
= [1.          +0.j
0.9996503988113559+0.01782586060792601j
0.9981987938758992+0.03676512500142493j
0.9961467868990754+0.05396398347754383j
0.9935019779067249+0.07240164616559697j
0.9899223657360434+0.08898490254866864j
0.9855067507229525+0.10544655851829887j
0.9793887299216817+0.12315461872570377j
0.9737571107741767+0.139616274695334j
0.9678670907481086+0.15591833012232237j
0.9593094616521696+0.17577719764247202j
0.9515194351660796+0.18777003841813067j
0.942467804390535 +0.19759687182936414j

```

0.9320481689637745+0.21454492945276016j
0.9214841330460524+0.2349965989884366j
0.912455302348028 +0.24552263477695835j
0.9008652629418941+0.25800187720638257j
0.8861516129154838+0.2705419198425274j
0.8756939773595229+0.28191155849929883j
0.8631463346975379+0.2927719954247845j]
fit1: [0.3832987169210772 -0.3016325880620756]
[0.3832987169210772 -0.3016325880620756 0.3833087168210772
-0.] 6.391147568700804e-10
[2.8772145391264203e-01 -3.4474472091413344e-01
2.9743907970936434e-01
-5.8330098422980148e-02 2.2698104592081145e-06]
5.552887928865353e-10
E_gs: -0.34474472091413344
test mps sampling took: (0.001287221908569336, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.06241071773696717
1 Execution time: 0:00:47.399321 ovlp:
(0.9999543998449594+0.006258621279312315j)
2 Execution time: 0:00:47.401852 ovlp:
(0.9997567991731171+0.013934647377801035j)
3 Execution time: 0:00:47.404724 ovlp:
(0.9993767978811128+0.022469476396219656j)
4 Execution time: 0:00:47.408369 ovlp:
(0.9989511964340678+0.0304571035541521j)
5 Execution time: 0:00:47.413461 ovlp:
(0.9982063939017394+0.03802672929087958j)
6 Execution time: 0:00:47.418780 ovlp:
(0.9975451916536515+0.0417127418233223j)
7 Execution time: 0:00:47.425150 ovlp:
(0.996625588527001+0.05026277089342113j)
8 Execution time: 0:00:47.431559 ovlp:
(0.9957059854003503+0.060902807069544096j)
9 Execution time: 0:00:47.439458 ovlp:
(0.994375980878335+0.06520442169503382j)
10 Execution time: 0:00:47.446826 ovlp:
(0.9933727774674435+0.07486405453778544j)
11 Execution time: 0:00:47.455671 ovlp:
(0.9918299722219055+0.07746326337509557j)
12 Execution time: 0:00:47.465916 ovlp:
(0.9899983659944445+0.08288208179907808j)
13 Execution time: 0:00:47.476078 ovlp:
(0.9889115622993119+0.09408451988736766j)
14 Execution time: 0:00:47.487265 ovlp:

```

(0.9865327542113642+0.09983773944831409j)
15 Execution time: 0:00:47.499531 ovlp:
(0.9847467481389436+0.10420775430636464j)
16 Execution time: 0:00:47.511205 ovlp:
(0.9818663383455504+0.11487059056000781j)
17 Execution time: 0:00:47.523227 ovlp:
(0.9799131317046479+0.12028180895815055j)
18 Execution time: 0:00:47.536056 ovlp:
(0.977937124986225+0.12886223813160957j)
19 Execution time: 0:00:47.552352 ovlp:
(0.9757103174150792+0.1334070535839822j)
x_points = [np.float64(0.0), np.float64(0.06241071773696717),
np.float64(0.12482143547393434), np.float64(0.18723215321090153),
np.float64(0.2496428709478687), np.float64(0.31205358868483585),
np.float64(0.37446430642180306), np.float64(0.4368750241587702),
np.float64(0.4992857418957374), np.float64(0.5616964596327045),
np.float64(0.6241071773696717), np.float64(0.6865178951066389),
np.float64(0.7489286128436061), np.float64(0.8113393305805733),
np.float64(0.8737500483175404), np.float64(0.9361607660545076),
np.float64(0.9985714837914748), np.float64(1.060982201528442),
np.float64(1.123392919265409), np.float64(1.1858036370023763)] y_points =
[1.          +0.j
0.9999543998449594+0.00625862127931232j
0.9997567991731171+0.01393464737780103j
0.9993767978811128+0.02246947639621966j
0.9989511964340678+0.0304571035541521j
0.9982063939017394+0.03802672929087958j
0.9975451916536515+0.0417127418233223j
0.996625588527001 +0.05026277089342113j
0.9957059854003503+0.0609028070695441j
0.994375980878335 +0.06520442169503382j
0.9933727774674435+0.07486405453778544j
0.9918299722219055+0.07746326337509557j
0.9899983659944445+0.08288208179907808j
0.9889115622993119+0.09408451988736766j
0.9865327542113642+0.09983773944831409j
0.9847467481389436+0.10420775430636464j
0.9818663383455504+0.11487059056000781j
0.9799131317046479+0.12028180895815055j
0.977937124986225 +0.12886223813160957j
0.9757103174150792+0.1334070535839822j ]
fit1: [ 0.367645503374333 -0.3150073053463785]
[ 0.367645503374333 -0.3150073053463785 0.367655503274333
-0.          ] 2.014168054245993e-10
[ 2.7235719261380953e-01 -3.5517365710215376e-01
2.7875318284143835e-01
-6.8021286536604372e-02 3.5987838892939531e-06]

```

```

1.9575832941818583e-10
E_gs: -0.35517365710215376
test mps sampling took: (0.0012793540954589844, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.07964367853800836
1 Execution time: 0:00:48.085924 ovlp:
(0.999886+0.009339999999999904j)
2 Execution time: 0:00:48.087819 ovlp:
(0.9995099999999999+0.01820400000000011j)
3 Execution time: 0:00:48.090476 ovlp:
(0.9989859999999999+0.02544799999999915j)
4 Execution time: 0:00:48.093618 ovlp:
(0.998146+0.03804999999999992j)
5 Execution time: 0:00:48.097417 ovlp:
(0.9972179999999999+0.04834800000000006j)
x_points = [np.float64(0.0), np.float64(0.07964367853800836),
np.float64(0.1592873570760167), np.float64(0.23893103561402507),
np.float64(0.3185747141520334), np.float64(0.3982183926900418)] y_points
= [1.          +0.j
0.999886      +0.009339999999999999j
0.9995099999999999+0.01820400000000011j
0.9989859999999999+0.02544799999999915j
0.998146      +0.03804999999999992j
0.9972179999999999+0.04834800000000006j]
fit1: [ 0.2846544050849271 -0.43018522447626567]
[ 0.2846544050849271 -0.43018522447626567 0.2846644049849271
-0.          ] 1.0745352107915559e-10
[ 2.4160059856896668e-01 -3.6546823010381102e-01
2.4139093229572037e-01
-1.3751911693361091e-01 1.5287936474166687e-06]
8.052606925615447e-11
E_gs: -0.365468230103811
test mps sampling took: (0.0013015270233154297, Counter({0: 8, 2: 2}))
truncated ham size: 12 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.00264942199935932
1 Execution time: 0:00:48.435683 ovlp: (1+0.0014119999999999688j)
2 Execution time: 0:00:48.437587 ovlp:
(0.99999600000000001+0.00030799999999997496j)
3 Execution time: 0:00:48.440204 ovlp: (1+0.0025159999999999627j)
4 Execution time: 0:00:48.443330 ovlp: (1+0.00250400000000000617j)
5 Execution time: 0:00:48.447071 ovlp: (1+0.000428000000000009497j)
6 Execution time: 0:00:48.451452 ovlp: (1+0.00183200000000000558j)
7 Execution time: 0:00:48.456626 ovlp: (1+0.00252000000000000777j)

```

```

8 Execution time: 0:00:48.462461 ovlp:
(0.999992+0.00239600000000000647j)
9 Execution time: 0:00:48.469424 ovlp:
(0.999980000000000001+0.00076800000000001019j)
10 Execution time: 0:00:48.476713 ovlp:
(0.999996000000000001+0.00242800000000000967j)
x_points = [np.float64(0.0), np.float64(0.00264942199935932),
np.float64(0.00529884399871864), np.float64(0.00794826599807796),
np.float64(0.01059768799743728), np.float64(0.0132471099967966),
np.float64(0.01589653199615592), np.float64(0.01854595399551524),
np.float64(0.02119537599487456), np.float64(0.02384479799423388),
np.float64(0.0264942199935932)] y_points = [1.          +0.j
1.          +0.001411999999999997j
0.999996000000000001+0.000307999999999997j
1.          +0.002515999999999996j
1.          +0.0025040000000000006j
1.          +0.0004280000000000009j
1.          +0.0018320000000000006j
1.          +0.0025200000000000008j
0.999992      +0.0023960000000000006j
0.999980000000000001+0.000768000000000001j
0.999996000000000001+0.002428000000000001j ]
fit1: [ 0.09920851217471216 -2.232504479166677 ]
[ 0.09920851217471216 -2.232504479166677  0.09921851207471216
-0.          ] 3.18989777044165e-10
[ 8.6493212769496203e-02 -1.9464030846778146e+00
8.6501238090654173e-02
-6.9552621238117984e-01 1.2818059630177713e-06]
3.7739460715169666e-10
E_gs: -1.9464030846778146
test mps sampling took: (0.0013225078582763672, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2754194488079325
1 Execution time: 0:00:48.628906 ovlp:
(0.998783995865586+0.031414706810003246j)
2 Execution time: 0:00:48.630763 ovlp:
(0.9945279813951367+0.06355521608773462j)
3 Execution time: 0:00:48.633280 ovlp:
(0.988151559715303+0.09497372291065798j)
4 Execution time: 0:00:48.636529 ovlp:
(0.9788491280870355+0.12620222908757883j)
5 Execution time: 0:00:48.640336 ovlp:
(0.9667498869496156+0.15588793001896217j)
6 Execution time: 0:00:48.645178 ovlp:
(0.9541186440033895+0.18629563340515354j)

```

```

7 Execution time: 0:00:48.651960 ovlp:
(0.9366233845195073+0.20975691317350487j)
8 Execution time: 0:00:48.659841 ovlp:
(0.9189685244929833+0.238925812347762j)
9 Execution time: 0:00:48.667335 ovlp:
(0.8980988535361021+0.258739079712871j)
10 Execution time: 0:00:48.675892 ovlp:
(0.8770011818040182+0.2801711525819188j)
11 Execution time: 0:00:48.684136 ovlp:
(0.8497550891673031+0.30480283632964356j)
12 Execution time: 0:00:48.692643 ovlp:
(0.8256478072025444+0.31998768795813914j)
13 Execution time: 0:00:48.703798 ovlp:
(0.8023765280801956+0.3357273414729609j)
14 Execution time: 0:00:48.715002 ovlp:
(0.7745984336346743+0.34654217824340594j)
15 Execution time: 0:00:48.727396 ovlp:
(0.7491535471220603+0.35582180979415323j)
16 Execution time: 0:00:48.739922 ovlp:
(0.7186470433999474+0.3656106430761865j)
17 Execution time: 0:00:48.753406 ovlp:
(0.6923357539415633+0.3706342601564845j)
18 Execution time: 0:00:48.768052 ovlp:
(0.6646792599094837+0.37498907496285483j)
19 Execution time: 0:00:48.783088 ovlp:
(0.6379119689006942+0.3770942821205592j)
x_points = [np.float64(0.0), np.float64(0.2754194488079325),
np.float64(0.550838897615865), np.float64(0.8262583464237976),
np.float64(1.10167779523173), np.float64(1.3770972440396625),
np.float64(1.6525166928475952), np.float64(1.9279361416555276),
np.float64(2.20335559046346), np.float64(2.4787750392713925),
np.float64(2.754194488079325), np.float64(3.0296139368872574),
np.float64(3.3050333856951903), np.float64(3.580452834503123),
np.float64(3.8558722833110552), np.float64(4.131291732118988),
np.float64(4.40671118092692), np.float64(4.682130629734853),
np.float64(4.957550078542785), np.float64(5.2329695273507175)] y_points
= [1.          +0.j
0.998783995865586 +0.03141470681000325j
0.9945279813951367+0.06355521608773462j
0.988151559715303 +0.09497372291065798j
0.9788491280870355+0.12620222908757883j
0.9667498869496156+0.15588793001896217j
0.9541186440033895+0.18629563340515354j
0.9366233845195073+0.20975691317350487j
0.9189685244929833+0.238925812347762j
0.8980988535361021+0.258739079712871j
0.8770011818040182+0.2801711525819188j

```


0.8497550891673031+0.30480283632964356j
0.8256478072025444+0.31998768795813914j
0.8023765280801956+0.3357273414729609j
0.7745984336346743+0.34654217824340594j
0.7491535471220603+0.35582180979415323j
0.7186470433999474+0.3656106430761865j
0.6923357539415633+0.3706342601564845j
0.6646792599094837+0.37498907496285483j
0.6379119689006942+0.3770942821205592j]
fit1: [0.38114823121931074 -0.29569000546143037]
[0.2827356610124618 -0.3465351154011291 0.38071001816863403
-0.05038241306895431] 4.752827521069672e-10
[0.2855047062964388 -0.34539066856572287 0.28801066749883486
-0.05321227971006935 -0.00758635861092041] 4.984855078240293e-10
E_gs: -0.34539066856572287
test mps sampling took: (0.0012803077697753906, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1503339818475377
1 Execution time: 0:00:49.204037 ovlp:
(0.9996615990524773+0.014727641237395561j)
2 Execution time: 0:00:49.205989 ovlp:
(0.9984015955244674+0.03397329512522629j)
3 Execution time: 0:00:49.208587 ovlp:
(0.9963783898594916+0.05054774153367636j)
4 Execution time: 0:00:49.212417 ovlp:
(0.9935703819970696+0.06670458677284286j)
5 Execution time: 0:00:49.216633 ovlp:
(0.9901503724210428+0.08393423501585806j)
6 Execution time: 0:00:49.221922 ovlp:
(0.9855927596597271+0.10425269190753728j)
7 Execution time: 0:00:49.228212 ovlp:
(0.980624745749288+0.12198634156175636j)
8 Execution time: 0:00:49.234262 ovlp:
(0.9754983313953278+0.13593998063194568j)
9 Execution time: 0:00:49.240939 ovlp:
(0.9682623111344713+0.15414883161672854j)
10 Execution time: 0:00:49.248111 ovlp:
(0.9604214891801697+0.17119847935574217j)
11 Execution time: 0:00:49.256107 ovlp:
(0.9540062712175594+0.18430251604704484j)
12 Execution time: 0:00:49.265759 ovlp:
(0.9432998412395555+0.195412147154012j)
13 Execution time: 0:00:49.276564 ovlp:
(0.9346526170273277+0.21688260727130038j)
14 Execution time: 0:00:49.288102 ovlp:

```

(0.9242125877952458+0.22622103341889366j)
15 Execution time: 0:00:49.298834  ovlp:
(0.9128149558818766+0.2435298818836693j)
16 Execution time: 0:00:49.312567  ovlp:
(0.9023605266094745+0.25230670645877806j)
17 Execution time: 0:00:49.326110  ovlp:
(0.892359698607156+0.2643595402067125j)
18 Execution time: 0:00:49.340463  ovlp:
(0.8792484618956933+0.2805811856273197j)
x_points = [np.float64(0.0), np.float64(0.1503339818475377),
np.float64(0.3006679636950754), np.float64(0.45100194554261314),
np.float64(0.6013359273901508), np.float64(0.7516699092376886),
np.float64(0.9020038910852263), np.float64(1.052337872932764),
np.float64(1.2026718547803017), np.float64(1.3530058366278395),
np.float64(1.5033398184753772), np.float64(1.6536738003229148),
np.float64(1.8040077821704525), np.float64(1.9543417640179903),
np.float64(2.104675745865528), np.float64(2.2550097277130656),
np.float64(2.4053437095606034), np.float64(2.555677691408141),
np.float64(2.706011673255679)] y_points = [1.          +0.j
0.9996615990524773+0.01472764123739556j
0.9984015955244674+0.03397329512522629j
0.9963783898594916+0.05054774153367636j
0.9935703819970696+0.06670458677284286j
0.9901503724210428+0.08393423501585806j
0.9855927596597271+0.10425269190753728j
0.980624745749288 +0.12198634156175636j
0.9754983313953278+0.13593998063194568j
0.9682623111344713+0.15414883161672854j
0.9604214891801697+0.17119847935574217j
0.9540062712175594+0.18430251604704484j
0.9432998412395555+0.195412147154012j
0.9346526170273277+0.21688260727130038j
0.9242125877952458+0.22622103341889366j
0.9128149558818766+0.2435298818836693j
0.9023605266094745+0.25230670645877806j
0.892359698607156 +0.2643595402067125j
0.8792484618956933+0.2805811856273197j ]
fit1: [ 0.38116983853161374 -0.30398794078986047]
[ 0.38116983853161374 -0.30398794078986047  0.38117983843161374
-0.          ] 3.7075632395660806e-10
[ 2.9060473929802599e-01 -3.4442804276291455e-01
2.9597214301618413e-01
-5.6338877153200781e-02  2.1552528249323668e-06]
3.8006470804246366e-10
E_gs: -0.34442804276291455
test mps sampling took: (0.0015134811401367188, Counter({2: 8, 0: 2}))
truncated ham size: 12 Number of fitting points: 5

```

```

shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.17169228497221425
1 Execution time: 0:00:49.706158 ovlp:
(0.99947040000000001+0.020132800000000006j)
2 Execution time: 0:00:49.708573 ovlp:
(0.99795839999999999+0.0400944000000000086j)
3 Execution time: 0:00:49.711369 ovlp:
(0.99531039999999999+0.059260799999999989j)
4 Execution time: 0:00:49.714884 ovlp:
(0.9917456+0.079814400000000006j)
x_points = [np.float64(0.0), np.float64(0.17169228497221425),
np.float64(0.3433845699444285), np.float64(0.5150768549166428),
np.float64(0.686769139888857)] y_points = [1.          +0.j
0.99947040000000001+0.020132800000000006j
0.99795839999999999+0.040094400000000009j
0.99531039999999999+0.059260799999999989j
0.9917456          +0.079814400000000006j]
fit1: [ 0.4896335668569083 -0.2446952223022572]
[ 0.4896335668569083 -0.2446952223022572  0.4896435667569083
-0.          ] 3.698069847406252e-11
[ 4.1996561867804111e-01 -2.0991694939904945e-01
4.1992884261771224e-01
-7.5465442835966956e-02  1.4242898991642159e-06]
1.777464925048513e-10
E_gs: -0.20991694939904945
test mps sampling took: (0.0013015270233154297, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 10
shots per matrix element: 555555.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2791753992791679
1 Execution time: 0:00:50.184106 ovlp:
(0.9986391986391987+0.03397143397143387j)
2 Execution time: 0:00:50.185976 ovlp:
(0.9948015948015947+0.06440946440946438j)
3 Execution time: 0:00:50.189167 ovlp:
(0.9870759870759871+0.09698589698589699j)
4 Execution time: 0:00:50.192783 ovlp:
(0.9777915777915778+0.12722952722952718j)
5 Execution time: 0:00:50.197462 ovlp:
(0.9665703665703667+0.15618795618795622j)
6 Execution time: 0:00:50.202773 ovlp:
(0.9521955521955523+0.18570438570438563j)
7 Execution time: 0:00:50.210294 ovlp:
(0.9343431343431343+0.2133380133380134j)
8 Execution time: 0:00:50.216995 ovlp:
(0.9164079164079164+0.23845163845163841j)

```

```

9 Execution time: 0:00:50.224305  ovlp:
(0.8941814941814943+0.26262206262206256j)
x_points = [np.float64(0.0), np.float64(0.2791753992791679),
np.float64(0.5583507985583358), np.float64(0.8375261978375037),
np.float64(1.1167015971166716), np.float64(1.3958769963958395),
np.float64(1.6750523956750074), np.float64(1.9542277949541753),
np.float64(2.233403194233343), np.float64(2.512578593512511)] y_points =
[1.          +0.j
0.9986391986391987+0.03397143397143387j
0.9948015948015947+0.06440946440946438j
0.9870759870759871+0.09698589698589699j
0.9777915777915778+0.12722952722952718j
0.9665703665703667+0.15618795618795622j
0.9521955521955523+0.18570438570438563j
0.9343431343431343+0.2133380133380134j
0.9164079164079164+0.23845163845163841j
0.8941814941814943+0.26262206262206256j]
fit1: [ 0.3848421830229912 -0.30144612909598933]
[ 0.3848421830229912 -0.30144612909598933  0.3848521829229912
 -0.          ] 1.4473370940102957e-11
[ 2.8799259121938786e-01 -3.4216464563617571e-01
 2.9494072657628229e-01
 -6.1824714776781579e-02  2.3371326366217974e-06]
3.423335882487081e-11
E_gs: -0.3421646456361757
test mps sampling took: (0.0013852119445800781, Counter({0: 7, 2: 3}))
truncated ham size: 12  Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.11225650983776059
1 Execution time: 0:00:50.768015  ovlp: (0.99976+0.011751999999999985j)
2 Execution time: 0:00:50.771464  ovlp:
(0.9991056+0.026156800000000009j)
3 Execution time: 0:00:50.774617  ovlp:
(0.9980047999999999+0.039422400000000008j)
4 Execution time: 0:00:50.779121  ovlp:
(0.9963872+0.051913600000000004j)
x_points = [np.float64(0.0), np.float64(0.11225650983776059),
np.float64(0.22451301967552117), np.float64(0.33676952951328176),
np.float64(0.44902603935104235)] y_points = [1.          +0.j
0.99976          +0.01175199999999998j
0.9991056        +0.026156800000000009j
0.9980047999999999+0.039422400000000008j
0.9963872        +0.0519136j          ]
fit1: [ 0.2847887518487778 -0.42721059537365397]
[ 0.2847887518487778 -0.42721059537365397  0.2847987517487778
 -0.          ] 4.5927990232038346e-11

```

```

[ 2.4242170659938944e-01 -3.6367071720591926e-01
 2.4242492658301643e-01
 -1.3728185996536188e-01 1.4879359409426205e-06]
2.633960097332023e-11
E_gs: -0.36367071720591926
test mps sampling took: (0.0012848377227783203, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2619859614378281
1 Execution time: 0:00:51.258023 ovlp:
(0.9989007982412772+0.030249648399437445j)
2 Execution time: 0:00:51.259905 ovlp:
(0.9950895921433474+0.06073449717519552j)
3 Execution time: 0:00:51.262421 ovlp:
(0.9890127824204518+0.09159374654999453j)
4 Execution time: 0:00:51.266157 ovlp:
(0.9806991691186706+0.12036019257630803j)
5 Execution time: 0:00:51.270398 ovlp:
(0.969932751892403+0.14804183686693895j)
6 Execution time: 0:00:51.275738 ovlp:
(0.9568047308875693+0.17509468015148832j)
7 Execution time: 0:00:51.281559 ovlp:
(0.9424719079550528+0.201969923151877j)
8 Execution time: 0:00:51.287534 ovlp:
(0.9256574810519698+0.22486595978553559j)
9 Execution time: 0:00:51.294152 ovlp:
(0.9074750519600832+0.25303240485184775j)
10 Execution time: 0:00:51.301504 ovlp:
(0.8884094214550744+0.27215083544133667j)
11 Execution time: 0:00:51.310592 ovlp:
(0.8644141830626928+0.2908324653319445j)
12 Execution time: 0:00:51.320490 ovlp:
(0.8415805465288744+0.3075556920891074j)
x_points = [np.float64(0.0), np.float64(0.2619859614378281),
np.float64(0.5239719228756562), np.float64(0.7859578843134842),
np.float64(1.0479438457513124), np.float64(1.3099298071891405),
np.float64(1.5719157686269685), np.float64(1.8339017300647966),
np.float64(2.0958876915026248), np.float64(2.357873652940453),
np.float64(2.619859614378281), np.float64(2.8818455758161092),
np.float64(3.143831537253937)] y_points = [1.          +0.j
0.9989007982412772+0.03024964839943745j
0.9950895921433474+0.06073449717519552j
0.9890127824204518+0.09159374654999453j
0.9806991691186706+0.12036019257630803j
0.969932751892403 +0.14804183686693895j
0.9568047308875693+0.17509468015148832j

```

0.9424719079550528+0.201969923151877j
 0.9256574810519698+0.22486595978553559j
 0.9074750519600832+0.25303240485184775j
 0.8884094214550744+0.27215083544133667j
 0.8644141830626928+0.2908324653319445j
 0.8415805465288744+0.3075556920891074j]
 fit1: [0.38184458996105874 -0.3019237639457964]
 [0.38184458996105874 -0.3019237639457964 0.38185458986105875
 -0.] 1.4616279988795914e-10
 [2.8886791744443424e-01 -3.4409776664305408e-01
 2.9589294633919849e-01
 -5.8556782728604713e-02 2.3773730446944666e-06]
 4.9898061070128775e-11
 E_gs: -0.3440977666430541
 test mps sampling took: (0.001272439956665039, Counter({2: 6, 0: 4}))
 truncated ham size: 12 Number of fitting points: 23
 shots per matrix element: 227272.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.028878157697720154
 1 Execution time: 0:00:51.768989 ovlp:
 (0.9999735999155197+0.008676827765848882j)
 2 Execution time: 0:00:51.770923 ovlp:
 (0.9999295997747193+0.006107219543102449j)
 3 Execution time: 0:00:51.773449 ovlp:
 (0.999903199690239+0.010384033228906242j)
 4 Execution time: 0:00:51.776719 ovlp:
 (0.9998943996620788+0.014520046464148617j)
 5 Execution time: 0:00:51.780641 ovlp:
 (0.9996655989299166+0.013024041676933384j)
 6 Execution time: 0:00:51.785199 ovlp:
 (0.9993927980569537+0.01787285719314302j)
 7 Execution time: 0:00:51.791464 ovlp:
 (0.9991903974092717+0.025009680030976034j)
 8 Execution time: 0:00:51.798340 ovlp:
 (0.9990671970150304+0.028274490478369607j)
 9 Execution time: 0:00:51.805662 ovlp:
 (0.9987943961420676+0.03170650146080467j)
 10 Execution time: 0:00:51.813131 ovlp:
 (0.9985039952127848+0.03619451582245059j)
 11 Execution time: 0:00:51.821177 ovlp:
 (0.9981255940019007+0.03527931289380115j)
 12 Execution time: 0:00:51.830038 ovlp:
 (0.9977647928473372+0.03415290928930981j)
 13 Execution time: 0:00:51.840285 ovlp:
 (0.9973511915238129+0.04590974691119021j)
 14 Execution time: 0:00:51.852316 ovlp:
 (0.9967967897497272+0.04718575099440314j)

```

15 Execution time: 0:00:51.864857  ovlp:
(0.9967263895244465+0.050001760005631946j)
16 Execution time: 0:00:51.877478  ovlp:
(0.9965855890738851+0.05260656834101862j)
17 Execution time: 0:00:51.890675  ovlp:
(0.9959519870463585+0.056029779295293736j)
18 Execution time: 0:00:51.906507  ovlp:
(0.99510718434299+0.057340983491147135j)
19 Execution time: 0:00:51.920565  ovlp:
(0.9946759829631455+0.0644690063008202j)
20 Execution time: 0:00:51.937650  ovlp:
(0.9941567813017003+0.06474180717378286j)
21 Execution time: 0:00:51.955364  ovlp:
(0.9934087789080925+0.07280263296842548j)
22 Execution time: 0:00:51.972693  ovlp:
(0.9933911788517724+0.0707610264352847j)
x_points = [np.float64(0.0), np.float64(0.028878157697720154),
np.float64(0.05775631539544031), np.float64(0.08663447309316047),
np.float64(0.11551263079088062), np.float64(0.14439078848860076),
np.float64(0.17326894618632094), np.float64(0.20214710388404108),
np.float64(0.23102526158176123), np.float64(0.2599034192794814),
np.float64(0.2887815769772015), np.float64(0.3176597346749217),
np.float64(0.3465378923726419), np.float64(0.375416050070362),
np.float64(0.40429420776808217), np.float64(0.4331723654658023),
np.float64(0.46205052316352246), np.float64(0.49092868086124264),
np.float64(0.5198068385589628), np.float64(0.5486849962566829),
np.float64(0.577563153954403), np.float64(0.6064413116521232),
np.float64(0.6353194693498434)] y_points = [1.          +0.j
0.9999735999155197+0.00867682776584888j
0.9999295997747193+0.00610721954310245j
0.999903199690239 +0.01038403322890624j
0.9998943996620788+0.01452004646414862j
0.9996655989299166+0.01302404167693338j
0.9993927980569537+0.01787285719314302j
0.9991903974092717+0.02500968003097603j
0.9990671970150304+0.02827449047836961j
0.9987943961420676+0.03170650146080467j
0.9985039952127848+0.03619451582245059j
0.9981255940019007+0.03527931289380115j
0.9977647928473372+0.03415290928930981j
0.9973511915238129+0.04590974691119021j
0.9967967897497272+0.04718575099440314j
0.9967263895244465+0.05000176000563195j
0.9965855890738851+0.05260656834101862j
0.9959519870463585+0.05602977929529374j
0.99510718434299  +0.05734098349114713j
0.9946759829631455+0.0644690063008202j

```

```

0.9941567813017003+0.06474180717378286j
0.9934087789080925+0.07280263296842548j
0.9933911788517724+0.0707610264352847j ]
fit1: [ 0.3275411795105028 -0.34994705227438044]
[ 0.3275411795105028 -0.34994705227438044 0.3275511794105028
-0.          ] 1.2021343421270728e-09
[ 2.4367697179000009e-01 -3.7290477250449527e-01
2.7315321494794220e-01
-8.6639758034870479e-02 2.9068599862270611e-06]
1.1785717858183666e-09
E_gs: -0.3729047725044953
test mps sampling took: (0.0013904571533203125, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.039668165942904884
1 Execution time: 0:00:52.689840 ovlp:
(0.9999559999559999+0.0054890054890055495j)
2 Execution time: 0:00:52.691797 ovlp:
(0.9998503998503998+0.010782210782210866j)
3 Execution time: 0:00:52.694991 ovlp:
(0.9997227997227998+0.01446941446941441j)
4 Execution time: 0:00:52.698559 ovlp:
(0.9995203995203996+0.017140217140217073j)
5 Execution time: 0:00:52.702901 ovlp:
(0.9993355993355992+0.021179421179421176j)
6 Execution time: 0:00:52.707574 ovlp:
(0.9989879989879991+0.02718982718982721j)
7 Execution time: 0:00:52.712957 ovlp:
(0.9986755986755986+0.031044231044231152j)
8 Execution time: 0:00:52.719017 ovlp:
(0.9982311982311982+0.038031438031437936j)
9 Execution time: 0:00:52.726401 ovlp:
(0.9978175978175978+0.039624239624239666j)
10 Execution time: 0:00:52.735168 ovlp:
(0.9972851972851973+0.04487784487784485j)
11 Execution time: 0:00:52.744138 ovlp:
(0.9966999966999968+0.05136345136345133j)
x_points = [np.float64(0.0), np.float64(0.039668165942904884),
np.float64(0.07933633188580977), np.float64(0.11900449782871465),
np.float64(0.15867266377161954), np.float64(0.19834082971452444),
np.float64(0.2380089956574293), np.float64(0.2776771616003342),
np.float64(0.3173453275432391), np.float64(0.357013493486144),
np.float64(0.39668165942904887), np.float64(0.4363498253719537)]
y_points = [1.          +0.j
0.9999559999559999+0.00548900548900555j
0.9998503998503998+0.01078221078221087j

```



```

0.9997227997227998+0.01446941446941441j
0.9995203995203996+0.01714021714021707j
0.9993355993355992+0.02117942117942118j
0.9989879989879991+0.02718982718982721j
0.9986755986755986+0.03104423104423115j
0.9982311982311982+0.03803143803143794j
0.9978175978175978+0.03962423962423967j
0.9972851972851973+0.04487784487784485j
0.9966999966999968+0.05136345136345133j]
fit1: [ 0.48389081655766164 -0.24161312873779264]
[ 0.48389081655766164 -0.24161312873779264 0.48390081645766164
 -0.          ] 2.8088509461972455e-11
[ 4.1082710361947261e-01 -2.0477528784964605e-01
 4.1123080398648060e-01
 -8.2027059958356810e-02 1.4963045394455334e-06]
5.83579520812608e-11
E_gs: -0.20477528784964605
test mps sampling took: (0.0013086795806884766, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.028647957338000365
1 Execution time: 0:00:53.294481 ovlp:
(0.999986+0.0030920000000000947j)
2 Execution time: 0:00:53.296555 ovlp:
(0.999938+0.007144000000000039j)
3 Execution time: 0:00:53.299200 ovlp:
(0.999878+0.008550000000000058j)
4 Execution time: 0:00:53.302396 ovlp:
(0.9997860000000001+0.01376400000000011j)
5 Execution time: 0:00:53.306272 ovlp:
(0.999614+0.016475999999999935j)
x_points = [np.float64(0.0), np.float64(0.028647957338000365),
np.float64(0.05729591467600073), np.float64(0.0859438720140011),
np.float64(0.11459182935200146), np.float64(0.1432397866900018)]
y_points = [1.          +0.j
0.999986      +0.00309200000000009j
0.999938      +0.00714400000000004j
0.999878      +0.00855000000000006j
0.9997860000000001+0.01376400000000011j
0.999614      +0.01647599999999994j]
fit1: [ 0.0951970910706001 -1.397415939499636 ]
[ 0.0951970910706001 -1.397415939499636 0.09520709097060011
 -0.          ] 7.510518211942064e-11
[ 8.3461399497170213e-02 -1.2255004477406455e+00
 8.3453006634446492e-02
 -4.4784987198883380e-01 1.2365168091017134e-06]

```

1.7153044373192196e-10

E_gs: -1.2255004477406455

test mps sampling took: (0.001333475112915039, Counter({2: 5, 0: 5}))

truncated ham size: 12 Number of fitting points: 22

shots per matrix element: 238095.0

Total gate count: 224 2 qubit gates: 120

N gate: 224 dt: 0.15950758414744654

1 Execution time: 0:00:53.507461 ovlp:

(0.9995631995631995+0.01929061929061926j)

2 Execution time: 0:00:53.509450 ovlp:

(0.9981771981771981+0.0385602385602386j)

3 Execution time: 0:00:53.513959 ovlp:

(0.9958251958251958+0.060492660492660555j)

4 Execution time: 0:00:53.518301 ovlp:

(0.9925995925995925+0.07548667548667543j)

5 Execution time: 0:00:53.523554 ovlp:

(0.9888447888447889+0.09040509040509037j)

6 Execution time: 0:00:53.528822 ovlp:

(0.984098784098784+0.10903630903630912j)

7 Execution time: 0:00:53.536028 ovlp:

(0.9776475776475777+0.1298599298599299j)

8 Execution time: 0:00:53.546731 ovlp:

(0.9712635712635713+0.14175434175434165j)

9 Execution time: 0:00:53.555518 ovlp:

(0.9647451647451648+0.16269556269556262j)

10 Execution time: 0:00:53.564965 ovlp:

(0.9567819567819569+0.17745437745437753j)

11 Execution time: 0:00:53.574757 ovlp:

(0.9476511476511476+0.19543039543039553j)

12 Execution time: 0:00:53.584338 ovlp:

(0.9377559377559377+0.21360801360801362j)

13 Execution time: 0:00:53.595422 ovlp:

(0.9266427266427266+0.2213864213864214j)

14 Execution time: 0:00:53.607814 ovlp:

(0.9153027153027153+0.23795963795963804j)

15 Execution time: 0:00:53.619604 ovlp:

(0.9057435057435057+0.2524412524412525j)

16 Execution time: 0:00:53.631621 ovlp:

(0.8930426930426931+0.26662886662886653j)

17 Execution time: 0:00:53.643811 ovlp:

(0.8794598794598794+0.27564207564207566j)

18 Execution time: 0:00:53.657890 ovlp:

(0.8643818643818644+0.2922656922656923j)

19 Execution time: 0:00:53.673924 ovlp:

(0.8512946512946513+0.3008505008505009j)

20 Execution time: 0:00:53.691056 ovlp:

(0.8391986391986392+0.3140133140133141j)

```

21 Execution time: 0:00:53.706116  ovlp:
(0.8228270228270229+0.3239841239841239j)
x_points = [np.float64(0.0), np.float64(0.15950758414744654),
np.float64(0.31901516829489307), np.float64(0.4785227524423396),
np.float64(0.6380303365897861), np.float64(0.7975379207372326),
np.float64(0.9570455048846792), np.float64(1.1165530890321258),
np.float64(1.2760606731795723), np.float64(1.4355682573270188),
np.float64(1.5950758414744652), np.float64(1.754583425621912),
np.float64(1.9140910097693584), np.float64(2.073598593916805),
np.float64(2.2331061780642516), np.float64(2.392613762211698),
np.float64(2.5521213463591446), np.float64(2.711628930506591),
np.float64(2.8711365146540375), np.float64(3.030644098801484),
np.float64(3.1901516829489305), np.float64(3.3496592670963774)]
y_points = [1.          +0.j
0.9995631995631995+0.01929061929061926j
0.9981771981771981+0.0385602385602386j
0.9958251958251958+0.06049266049266055j
0.9925995925995925+0.07548667548667543j
0.9888447888447889+0.09040509040509037j
0.984098784098784 +0.10903630903630912j
0.9776475776475777+0.1298599298599299j
0.9712635712635713+0.14175434175434165j
0.9647451647451648+0.16269556269556262j
0.9567819567819569+0.17745437745437753j
0.9476511476511476+0.19543039543039553j
0.9377559377559377+0.21360801360801362j
0.9266427266427266+0.2213864213864214j
0.9153027153027153+0.23795963795963804j
0.9057435057435057+0.2524412524412525j
0.8930426930426931+0.26662886662886653j
0.8794598794598794+0.27564207564207566j
0.8643818643818644+0.2922656922656923j
0.8512946512946513+0.3008505008505009j
0.8391986391986392+0.3140133140133141j
0.8228270228270229+0.3239841239841239j ]
fit1: [ 0.38322583176988184 -0.3013689626431635 ]
[ 0.38322583176988184 -0.3013689626431635  0.38323583166988184
-0.          ] 1.0028276633223524e-09
[ 2.6658708409251186e-01 -3.5531508674015083e-01
2.9630944270985465e-01
-7.5228452392988615e-02 1.5097795402958917e-06]
6.426328934873415e-10
E_gs: -0.35531508674015083
test mps sampling took: (0.0012984275817871094, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 224 2 qubit gates: 120

```

N gate: 224 dt: 0.1634434081495693

1 Execution time: 0:00:54.106334 ovlp:

(0.9995463995463996+0.01736701736701729j)

2 Execution time: 0:00:54.108368 ovlp:

(0.9982191982191981+0.03757743757743759j)

3 Execution time: 0:00:54.111025 ovlp:

(0.9958503958503959+0.05457905457905454j)

4 Execution time: 0:00:54.114339 ovlp:

(0.9923055923055923+0.07504987504987515j)

5 Execution time: 0:00:54.118165 ovlp:

(0.9877191877191878+0.09093429093429095j)

6 Execution time: 0:00:54.122688 ovlp:

(0.982964782964783+0.11183351183351187j)

7 Execution time: 0:00:54.127833 ovlp:

(0.9772359772359773+0.12973392973392972j)

8 Execution time: 0:00:54.133680 ovlp:

(0.9704067704067705+0.14254394254394254j)

9 Execution time: 0:00:54.140357 ovlp:

(0.9627711627711628+0.16637476637476634j)

10 Execution time: 0:00:54.147545 ovlp:

(0.9544047544047545+0.18298998298998304j)

11 Execution time: 0:00:54.155549 ovlp:

(0.9459963459963461+0.19883239883239878j)

12 Execution time: 0:00:54.164153 ovlp:

(0.933858338583339+0.21797601797601796j)

13 Execution time: 0:00:54.173384 ovlp:

(0.9229803229803231+0.22895482895482888j)

14 Execution time: 0:00:54.183200 ovlp:

(0.9115311115311115+0.24407484407484414j)

15 Execution time: 0:00:54.195743 ovlp:

(0.8999306999307+0.2610260610260611j)

16 Execution time: 0:00:54.207551 ovlp:

(0.8885150885150885+0.2705264705264705j)

17 Execution time: 0:00:54.219702 ovlp:

(0.8724458724458724+0.2830508830508831j)

18 Execution time: 0:00:54.232575 ovlp:

(0.8595350595350595+0.2961296961296962j)

19 Execution time: 0:00:54.246058 ovlp:

(0.8456918456918456+0.30587370587370577j)

20 Execution time: 0:00:54.260149 ovlp:

(0.8310170310170311+0.3167349167349167j)

21 Execution time: 0:00:54.275224 ovlp:

(0.8156198156198156+0.3228921228921229j)

x_points = [np.float64(0.0), np.float64(0.1634434081495693),

np.float64(0.3268868162991386), np.float64(0.49033022444870794),

np.float64(0.6537736325982773), np.float64(0.8172170407478465),

np.float64(0.9806604488974159), np.float64(1.1441038570469853),

```

np.float64(1.3075472651965545), np.float64(1.4709906733461238),
np.float64(1.634434081495693), np.float64(1.7978774896452625),
np.float64(1.9613208977948318), np.float64(2.1247643059444012),
np.float64(2.2882077140939705), np.float64(2.4516511222435398),
np.float64(2.615094530393109), np.float64(2.7785379385426783),
np.float64(2.9419813466922475), np.float64(3.105424754841817),
np.float64(3.268868162991386), np.float64(3.4323115711409558)] y_points =
[1.          +0.j
 0.9995463995463996+0.01736701736701729j
 0.9982191982191981+0.03757743757743759j
 0.9958503958503959+0.05457905457905454j
 0.9923055923055923+0.07504987504987515j
 0.9877191877191878+0.09093429093429095j
 0.982964782964783 +0.11183351183351187j
 0.9772359772359773+0.12973392973392972j
 0.9704067704067705+0.14254394254394254j
 0.9627711627711628+0.16637476637476634j
 0.9544047544047545+0.18298998298998304j
 0.9459963459963461+0.19883239883239878j
 0.9338583338583339+0.21797601797601796j
 0.9229803229803231+0.22895482895482888j
 0.9115311115311115+0.24407484407484414j
 0.8999306999307  +0.2610260610260611j
 0.8885150885150885+0.2705264705264705j
 0.8724458724458724+0.2830508830508831j
 0.8595350595350595+0.2961296961296962j
 0.8456918456918456+0.30587370587370577j
 0.8310170310170311+0.3167349167349167j
 0.8156198156198156+0.3228921228921229j ]
fit1: [ 0.3805888695271172 -0.3020982745206969]
[ 0.3805888695271172 -0.3020982745206969  0.3805988694271172
 -0.          ] 1.2895705140943576e-09
[ 2.9188023046479777e-01 -3.4226651138010217e-01
 2.8980907176519033e-01
 -5.6916553223299839e-02  2.5800699312158265e-06]
7.485895954835965e-10
E_gs: -0.34226651138010217
test mps sampling took: (0.0013148784637451172, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1443334794636236
1 Execution time: 0:00:54.727400 ovlp:
(0.9997347994165586+0.01798943957676702j)
2 Execution time: 0:00:54.729615 ovlp:
(0.9986195969631133+0.0376210827663821j)
3 Execution time: 0:00:54.732364 ovlp:

```

```

(0.9968515930735047+0.05157471346436959j)
4 Execution time: 0:00:54.736111  ovlp:
(0.9939139866107705+0.06601114522451956j)
5 Execution time: 0:00:54.740336  ovlp:
(0.9905547792205143+0.08417398518276742j)
6 Execution time: 0:00:54.745280  ovlp:
(0.986998371396417+0.09906601794523939j)
7 Execution time: 0:00:54.754881  ovlp:
(0.9819935603858327+0.11365885004947018j)
8 Execution time: 0:00:54.762017  ovlp:
(0.9767915489414076+0.1290132838292244j)
9 Execution time: 0:00:54.769452  ovlp:
(0.9698419336522541+0.14644172217178886j)
10 Execution time: 0:00:54.778240  ovlp:
(0.964061920936226+0.1607829537224983j)
11 Execution time: 0:00:54.786282  ovlp:
(0.9571463057218725+0.17516498536296776j)
12 Execution time: 0:00:54.795041  ovlp:
(0.9482858862289496+0.19101582023480446j)
13 Execution time: 0:00:54.804426  ovlp:
(0.9391942662273858+0.20622065368543807j)
14 Execution time: 0:00:54.814637  ovlp:
(0.9303270467195028+0.22020828445822582j)
15 Execution time: 0:00:54.825369  ovlp:
(0.9197530234566516+0.23468551630813583j)
16 Execution time: 0:00:54.838630  ovlp:
(0.9106410034102075+0.2462795418149919j)
17 Execution time: 0:00:54.850991  ovlp:
(0.9005769812693587+0.258478768653291j)
x_points = [np.float64(0.0), np.float64(0.1443334794636236),
np.float64(0.2886669589272472), np.float64(0.43300043839087077),
np.float64(0.5773339178544944), np.float64(0.721667397318118),
np.float64(0.8660008767817415), np.float64(1.0103343562453653),
np.float64(1.1546678357089888), np.float64(1.2990013151726123),
np.float64(1.443334794636236), np.float64(1.5876682740998596),
np.float64(1.732001753563483), np.float64(1.8763352330271068),
np.float64(2.0206687124907305), np.float64(2.165002191954354),
np.float64(2.3093356714179776), np.float64(2.453669150881601)] y_points =
[1.          +0.j
0.9997347994165586+0.01798943957676702j
0.9986195969631133+0.0376210827663821j
0.9968515930735047+0.05157471346436959j
0.9939139866107705+0.06601114522451956j
0.9905547792205143+0.08417398518276742j
0.986998371396417 +0.09906601794523939j
0.9819935603858327+0.11365885004947018j
0.9767915489414076+0.1290132838292244j

```

```

0.9698419336522541+0.14644172217178886j
0.964061920936226 +0.1607829537224983j
0.9571463057218725+0.17516498536296776j
0.9482858862289496+0.19101582023480446j
0.9391942662273858+0.20622065368543807j
0.9303270467195028+0.22020828445822582j
0.9197530234566516+0.23468551630813583j
0.9106410034102075+0.2462795418149919j
0.9005769812693587+0.258478768653291j ]
fit1: [ 0.3779526356164371 -0.3064928346219521]
[ 0.3779526356164371 -0.3064928346219521 0.3779626355164371
-0.          ] 2.1283993769574965e-10
[ 2.8737150328238970e-01 -3.4539423053787288e-01
2.9526582111374605e-01
-5.8656784579449395e-02 2.8396490104834873e-06]
1.9320273205197868e-10
E_gs: -0.3453942305378729
test mps sampling took: (0.0013430118560791016, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.17071747954637628
1 Execution time: 0:00:55.253810 ovlp:
(0.9994807994807995+0.018917818917818963j)
2 Execution time: 0:00:55.255794 ovlp:
(0.997971597971598+0.038898238898238846j)
3 Execution time: 0:00:55.258444 ovlp:
(0.9953491953491953+0.0577258577258577j)
4 Execution time: 0:00:55.262252 ovlp:
(0.9917631917631917+0.08002508002508013j)
5 Execution time: 0:00:55.266513 ovlp:
(0.9868351868351868+0.09532829532829523j)
6 Execution time: 0:00:55.272018 ovlp:
(0.9813615813615815+0.11609631609631599j)
7 Execution time: 0:00:55.277866 ovlp:
(0.9748847748847749+0.13551793551793545j)
8 Execution time: 0:00:55.283903 ovlp:
(0.967008767008767+0.1523567523567524j)
9 Execution time: 0:00:55.291407 ovlp:
(0.9589875589875589+0.17281237281237272j)
10 Execution time: 0:00:55.299865 ovlp:
(0.9504471504471506+0.1893167893167893j)
11 Execution time: 0:00:55.308041 ovlp:
(0.9401071401071401+0.2056628056628056j)
x_points = [np.float64(0.0), np.float64(0.17071747954637628),
np.float64(0.34143495909275257), np.float64(0.5121524386391288),
np.float64(0.6828699181855051), np.float64(0.8535873977318814),

```

```

np.float64(1.0243048772782577), np.float64(1.195022356824634),
np.float64(1.3657398363710103), np.float64(1.5364573159173864),
np.float64(1.7071747954637628), np.float64(1.8778922750101392)] y_points
= [1.          +0.j
0.9994807994807995+0.01891781891781896j
0.997971597971598 +0.03889823889823885j
0.9953491953491953+0.0577258577258577j
0.9917631917631917+0.08002508002508013j
0.9868351868351868+0.09532829532829523j
0.9813615813615815+0.11609631609631599j
0.9748847748847749+0.13551793551793545j
0.967008767008767 +0.1523567523567524j
0.9589875589875589+0.17281237281237272j
0.9504471504471506+0.1893167893167893j
0.9401071401071401+0.2056628056628056j ]
fit1: [ 0.38777402799660676 -0.2976007954011004 ]
[ 0.38777402799660676 -0.2976007954011004  0.38778402789660676
-0.          ] 3.2120205381162917e-11
[ 2.7497453148200413e-01 -3.5309875856199330e-01
2.6402998039759645e-01
-7.1877933088364668e-02  5.0271498197066678e-06]
3.267348275785432e-11
E_gs: -0.3530987585619933
test mps sampling took: (0.00131988525390625, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.07614957904773946
1 Execution time: 0:00:55.887060 ovlp:
(0.9999552+0.01112320000000011j)
2 Execution time: 0:00:55.889029 ovlp:
(0.9996031999999999+0.018188799999999894j)
3 Execution time: 0:00:55.891862 ovlp:
(0.9990399999999999+0.025683200000000017j)
4 Execution time: 0:00:55.895088 ovlp:
(0.9984767999999999+0.03769599999999995j)
5 Execution time: 0:00:55.898860 ovlp:
(0.997344+0.04442239999999997j)
6 Execution time: 0:00:55.903540 ovlp:
(0.9963968000000001+0.0527552j)
7 Execution time: 0:00:55.908707 ovlp:
(0.9951551999999999+0.0623807999999999j)
8 Execution time: 0:00:55.914632 ovlp:
(0.9934400000000001+0.06935040000000003j)
9 Execution time: 0:00:55.922338 ovlp:
(0.9916415999999999+0.07902079999999989j)
10 Execution time: 0:00:55.930804 ovlp:

```



```
(0.9894272+0.088409600000000009j)
11 Execution time: 0:00:55.938927  ovlp:
(0.988025600000000001+0.097638399999999999j)
12 Execution time: 0:00:55.948762  ovlp:
(0.9857216+0.105542400000000004j)
13 Execution time: 0:00:55.957916  ovlp:
(0.9826816+0.112576000000000001j)
14 Execution time: 0:00:55.969287  ovlp:
(0.9798848+0.122380799999999996j)
15 Execution time: 0:00:55.981985  ovlp:
(0.977062400000000001+0.131417600000000002j)
16 Execution time: 0:00:55.995900  ovlp:
(0.9741952+0.136761600000000004j)
x_points = [np.float64(0.0), np.float64(0.07614957904773946),
np.float64(0.15229915809547892), np.float64(0.2284487371432184),
np.float64(0.30459831619095784), np.float64(0.3807478952386973),
np.float64(0.4568974742864368), np.float64(0.5330470533341762),
np.float64(0.6091966323819157), np.float64(0.6853462114296551),
np.float64(0.7614957904773946), np.float64(0.837645369525134),
np.float64(0.9137949485728736), np.float64(0.989944527620613),
np.float64(1.0660941066683525), np.float64(1.1422436857160918),
np.float64(1.2183932647638314)] y_points = [1.          +0.j
0.9999552      +0.011123200000000011j
0.9996031999999999+0.018188799999999989j
0.9990399999999999+0.025683200000000002j
0.9984767999999999+0.037695999999999995j
0.997344        +0.044422399999999997j
0.9963968000000000+0.0527552j
0.9951551999999999+0.06238079999999999j
0.9934400000000000+0.069350400000000003j
0.9916415999999999+0.079020799999999989j
0.9894272      +0.088409600000000009j
0.9880256000000000+0.09763839999999999j
0.9857216      +0.105542400000000004j
0.9826816      +0.112576000000000001j
0.9798848      +0.122380799999999996j
0.9770624000000000+0.131417600000000002j
0.9741952      +0.136761600000000004j]
fit1: [ 0.3466073476529921 -0.33656551688698316]
[ 0.3466073476529921 -0.33656551688698316 0.3466173475529921
-0.          ] 1.4874612914704592e-10
[ 2.5847304410803779e-01 -3.4882121943252853e-01
2.8476908232330489e-01
-9.1919444963965077e-02 4.7037418013028336e-06]
4.430240258535671e-11
E_gs: -0.34882121943252853
test mps sampling took: (0.0013110637664794922, Counter({0: 6, 2: 4}))
```

```

truncated ham size: 12 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.25035925684443144
1 Execution time: 0:00:56.666654 ovlp:
(0.998696+0.02705599999999997j)
2 Execution time: 0:00:56.668739 ovlp:
(0.995328+0.05875999999999992j)
3 Execution time: 0:00:56.671499 ovlp:
(0.99030400000000001+0.08407199999999992j)
4 Execution time: 0:00:56.674721 ovlp: (0.982496+0.11635200000000001j)
5 Execution time: 0:00:56.678573 ovlp: (0.973344+0.14219200000000001j)
6 Execution time: 0:00:56.683205 ovlp: (0.960272+0.16862400000000001j)
7 Execution time: 0:00:56.688459 ovlp:
(0.94723200000000001+0.19269599999999998j)
8 Execution time: 0:00:56.695567 ovlp:
(0.930752+0.21964000000000006j)
9 Execution time: 0:00:56.703191 ovlp: (0.914544+0.2410239999999999j)
10 Execution time: 0:00:56.710883 ovlp:
(0.894048+0.2601199999999999j)
11 Execution time: 0:00:56.719022 ovlp: (0.874336+0.27893600000000001j)
12 Execution time: 0:00:56.727781 ovlp:
(0.854576+0.30022400000000005j)
13 Execution time: 0:00:56.738261 ovlp: (0.831288+0.312624j)
14 Execution time: 0:00:56.751272 ovlp: (0.80752+0.3313999999999999j)
15 Execution time: 0:00:56.763797 ovlp: (0.78196+0.338808j)
16 Execution time: 0:00:56.777986 ovlp:
(0.75764000000000001+0.35074399999999994j)
17 Execution time: 0:00:56.791373 ovlp:
(0.733984+0.36308000000000007j)
18 Execution time: 0:00:56.804286 ovlp:
(0.706456+0.3697999999999999j)
19 Execution time: 0:00:56.817761 ovlp: (0.68367200000000001+0.37412j)
20 Execution time: 0:00:56.831979 ovlp:
(0.65913599999999999+0.37452799999999997j)
x_points = [np.float64(0.0), np.float64(0.25035925684443144),
np.float64(0.5007185136888629), np.float64(0.7510777705332943),
np.float64(1.0014370273777258), np.float64(1.2517962842221573),
np.float64(1.502155410665886), np.float64(1.75251479791102),
np.float64(2.0028740547554515), np.float64(2.253233311599883),
np.float64(2.5035925684443145), np.float64(2.753951825288746),
np.float64(3.004311082133177), np.float64(3.2546703389776086),
np.float64(3.50502959582204), np.float64(3.7553888526664716),
np.float64(4.005748109510903), np.float64(4.256107366355335),
np.float64(4.506466623199766), np.float64(4.756825880044198),
np.float64(5.007185136888629)] y_points = [1.          +0.j
0.998696      +0.02705599999999997j

```

```

0.995328      +0.05875999999999992j
0.9903040000000001+0.08407199999999992j
0.982496      +0.11635200000000001j
0.973344      +0.14219200000000001j
0.960272      +0.16862400000000001j
0.9472320000000001+0.19269599999999998j
0.930752      +0.21964000000000006j
0.914544      +0.24102399999999999j
0.894048      +0.26011999999999999j
0.874336      +0.27893600000000001j
0.854576      +0.30022400000000005j
0.831288      +0.312624j
0.80752       +0.33139999999999999j
0.78196       +0.338808j
0.7576400000000001+0.35074399999999994j
0.733984      +0.36308000000000007j
0.706456      +0.36979999999999999j
0.6836720000000001+0.37412j
0.6591359999999999+0.37452799999999997j]
fit1: [ 0.3791169842837385 -0.2980119025181521]
[ 0.3106647142247376 -0.33221272573138216 0.37893030907686237
-0.03366249933711257] 9.298984698615648e-10
[ 0.2816255765485452 -0.34834851786285864 0.2717121795449111
-0.06009294497923166 -0.00600049598066248]
1.1773016583846645e-09
E_gs: -0.34834851786285864
test mps sampling took: (0.0012962818145751953, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.05109672476974215
1 Execution time: 0:00:57.236131 ovlp: (0.99996+0.006472000000000033j)
2 Execution time: 0:00:57.238085 ovlp: (0.9998+0.01051599999999997j)
3 Execution time: 0:00:57.240926 ovlp:
(0.9995480000000001+0.016040000000000054j)
4 Execution time: 0:00:57.244139 ovlp: (0.99928+0.02238399999999996j)
5 Execution time: 0:00:57.247957 ovlp:
(0.9988760000000001+0.028764000000000012j)
6 Execution time: 0:00:57.252501 ovlp:
(0.998156+0.03348799999999996j)
7 Execution time: 0:00:57.257644 ovlp:
(0.997836+0.040472000000000063j)
8 Execution time: 0:00:57.263562 ovlp: (0.99708+0.04628399999999999j)
9 Execution time: 0:00:57.271257 ovlp:
(0.9962279999999999+0.055803999999999965j)
10 Execution time: 0:00:57.279865 ovlp:
(0.9955320000000001+0.060740000000000016j)

```

```
x_points = [np.float64(0.0), np.float64(0.05109672476974215),
np.float64(0.1021934495394843), np.float64(0.15329017430922645),
np.float64(0.2043868990789686), np.float64(0.25548362384871076),
np.float64(0.3065803486184529), np.float64(0.35767707338819504),
np.float64(0.4087737981579372), np.float64(0.4598705229276793),
np.float64(0.5109672476974215)] y_points = [1.          +0.j
0.99996      +0.006472000000000003j
0.9998       +0.010515999999999997j
0.99954800000000001+0.016040000000000005j
0.99928      +0.022383999999999996j
0.99887600000000001+0.028764000000000001j
0.998156     +0.033487999999999996j
0.997836     +0.040472000000000006j
0.99708      +0.046283999999999999j
0.9962279999999999+0.055803999999999996j
0.99553200000000001+0.060740000000000002j]
fit1: [ 0.48652133619378846 -0.24268056074164346]
[ 0.48652133619378846 -0.24268056074164346  0.48653133609378846
-0.          ] 6.33754660771943e-11
[ 4.1272717402569481e-01 -2.0510048662029007e-01
4.1357305212082318e-01
-8.3377866877373696e-02  1.4880734887689788e-06]
1.293523085760771e-10
E_gs: -0.20510048662029007
test mps sampling took: (0.0012631416320800781, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.17348424811240287
1 Execution time: 0:00:57.740188 ovlp:
(0.99939200000000001+0.022086400000000006j)
2 Execution time: 0:00:57.742143 ovlp:
(0.997792+0.039622400000000006j)
3 Execution time: 0:00:57.745397 ovlp:
(0.9954304+0.0602815999999999935j)
4 Execution time: 0:00:57.748992 ovlp:
(0.9912064+0.080275199999999999j)
5 Execution time: 0:00:57.753406 ovlp:
(0.986624+0.098956800000000007j)
6 Execution time: 0:00:57.757941 ovlp: (0.9810048+0.12254079999999999j)
7 Execution time: 0:00:57.764295 ovlp:
(0.9742143999999999+0.13569279999999995j)
8 Execution time: 0:00:57.771114 ovlp:
(0.9673343999999999+0.156160000000000008j)
9 Execution time: 0:00:57.779385 ovlp:
(0.9581759999999999+0.17596799999999999j)
10 Execution time: 0:00:57.787940 ovlp:
```

```

(0.9486399999999999+0.19267199999999995j)
11 Execution time: 0:00:57.797929  ovlp: (0.9371072+0.20707840000000001j)
12 Execution time: 0:00:57.807749  ovlp:
(0.9267647999999999+0.22589440000000005j)
13 Execution time: 0:00:57.817210  ovlp:
(0.9156864+0.24050560000000001j)
14 Execution time: 0:00:57.828585  ovlp:
(0.9025023999999999+0.25634559999999995j)
15 Execution time: 0:00:57.839472  ovlp:
(0.8868351999999999+0.26961919999999995j)
16 Execution time: 0:00:57.851621  ovlp: (0.8730368+0.2835584j)
x_points = [np.float64(0.0), np.float64(0.17348424811240287),
np.float64(0.34696849622480574), np.float64(0.5204527443372087),
np.float64(0.6939369924496115), np.float64(0.8674212405620143),
np.float64(1.0409054886744173), np.float64(1.2143897367868202),
np.float64(1.387873984899223), np.float64(1.5613582330116258),
np.float64(1.7348424811240286), np.float64(1.9083267292364317),
np.float64(2.0818109773488347), np.float64(2.2552952254612375),
np.float64(2.4287794735736403), np.float64(2.602263721686043),
np.float64(2.775747969798446)] y_points = [1.          +0.j
0.99939200000000001+0.022086400000000006j
0.997792          +0.039622400000000006j
0.9954304         +0.060281599999999994j
0.9912064         +0.08027519999999999j
0.986624          +0.098956800000000007j
0.9810048         +0.12254079999999999j
0.9742143999999999+0.13569279999999995j
0.9673343999999999+0.15616000000000008j
0.9581759999999999+0.1759679999999999j
0.9486399999999999+0.19267199999999995j
0.9371072         +0.20707840000000001j
0.9267647999999999+0.22589440000000005j
0.9156864         +0.24050560000000001j
0.9025023999999999+0.25634559999999995j
0.8868351999999999+0.26961919999999995j
0.8730368         +0.2835584j          ]
fit1: [ 0.382616796187796 -0.3031774196287552]
[ 0.382616796187796 -0.3031774196287552  0.382626796087796
-0.          ] 1.6160056631165665e-10
[ 2.6504451661708833e-01 -3.5781478299502711e-01
3.0140772537983090e-01
-7.3317172849886203e-02  1.7234787962969442e-06]
9.964025251085831e-11
E_gs: -0.3578147829950271
test mps sampling took: (0.0012750625610351562, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 24
shots per matrix element: 217391.0

```

Total gate count: 224 2 qubit gates: 120

N gate: 224 dt: 0.13751471508488503

1 Execution time: 0:00:58.368996 ovlp:

(0.9996503995105592+0.01706142388599341j)

2 Execution time: 0:00:58.370966 ovlp:

(0.9988315983642377+0.03432064804890733j)

3 Execution time: 0:00:58.373766 ovlp:

(0.9968811956336738+0.04306986029780435j)

4 Execution time: 0:00:58.377146 ovlp:

(0.9942591919628687+0.06383428936800506j)

5 Execution time: 0:00:58.381023 ovlp:

(0.9916371882920636+0.08053231274523776j)

6 Execution time: 0:00:58.385585 ovlp:

(0.9878283829597361+0.09675193545270955j)

7 Execution time: 0:00:58.391826 ovlp:

(0.9834583768417275+0.11044155461817651j)

8 Execution time: 0:00:58.398776 ovlp:

(0.9784535698349979+0.12520757529060544j)

9 Execution time: 0:00:58.406174 ovlp:

(0.9732647625706676+0.14187799862919803j)

10 Execution time: 0:00:58.413711 ovlp:

(0.9669719537607353+0.15614721860610614j)

11 Execution time: 0:00:58.421839 ovlp:

(0.9603111444356023+0.1715848402187763j)

12 Execution time: 0:00:58.430463 ovlp:

(0.9534295348013486+0.18636926091696537j)

13 Execution time: 0:00:58.441136 ovlp:

(0.9450667230934122+0.19399607159450016j)

14 Execution time: 0:00:58.452071 ovlp:

(0.9373571122999573+0.20950729331021067j)

15 Execution time: 0:00:58.462823 ovlp:

(0.9279086990721788+0.22390531346743892j)

16 Execution time: 0:00:58.474400 ovlp:

(0.9182762855867999+0.23776053286474608j)

17 Execution time: 0:00:58.488569 ovlp:

(0.9075214705300587+0.24742974640164506j)

18 Execution time: 0:00:58.501814 ovlp:

(0.8978430569802798+0.2575221605310247j)

19 Execution time: 0:00:58.515354 ovlp:

(0.8869318417045784+0.2710277794388911j)

20 Execution time: 0:00:58.531808 ovlp:

(0.8755330257462361+0.2834661968526755j)

21 Execution time: 0:00:58.546794 ovlp:

(0.863821409349973+0.2917186084060517j)

22 Execution time: 0:00:58.564597 ovlp:

(0.8536277950789131+0.300044620062468j)

23 Execution time: 0:00:58.580870 ovlp:

```

(0.8386777741488838+0.3100450340630476j)
x_points = [np.float64(0.0), np.float64(0.13751471508488503),
np.float64(0.27502943016977005), np.float64(0.4125441452546551),
np.float64(0.5500588603395401), np.float64(0.6875735754244251),
np.float64(0.8250882905093102), np.float64(0.9626030055941952),
np.float64(1.1001177206790802), np.float64(1.2376324357639652),
np.float64(1.3751471508488502), np.float64(1.5126618659337352),
np.float64(1.6501765810186204), np.float64(1.7876912961035054),
np.float64(1.9252060111883904), np.float64(2.0627207262732754),
np.float64(2.2002354413581604), np.float64(2.3377501564430454),
np.float64(2.4752648715279304), np.float64(2.6127795866128154),
np.float64(2.7502943016977004), np.float64(2.8878090167825854),
np.float64(3.0253237318674704), np.float64(3.1628384469523554)]
y_points = [1.          +0.j
0.9996503995105592+0.01706142388599341j
0.9988315983642377+0.03432064804890733j
0.9968811956336738+0.04306986029780435j
0.9942591919628687+0.06383428936800506j
0.9916371882920636+0.08053231274523776j
0.9878283829597361+0.09675193545270955j
0.9834583768417275+0.11044155461817651j
0.9784535698349979+0.12520757529060544j
0.9732647625706676+0.14187799862919803j
0.9669719537607353+0.15614721860610614j
0.9603111444356023+0.1715848402187763j
0.9534295348013486+0.18636926091696537j
0.9450667230934122+0.19399607159450016j
0.9373571122999573+0.20950729331021067j
0.9279086990721788+0.22390531346743892j
0.9182762855867999+0.23776053286474608j
0.9075214705300587+0.24742974640164506j
0.8978430569802798+0.2575221605310247j
0.8869318417045784+0.2710277794388911j
0.8755330257462361+0.2834661968526755j
0.863821409349973 +0.2917186084060517j
0.8536277950789131+0.300044620062468j
0.8386777741488838+0.3100450340630476j ]
fit1: [ 0.38206215223413553 -0.302147067176972 ]
[ 0.38206215223413553 -0.302147067176972  0.38207215213413553
-0.          ] 5.319039011448062e-10
[ 2.8842807214653093e-01 -3.4515677726739319e-01
2.6841918335334386e-01
-6.3281077697491417e-02  8.0052589324447625e-06]
4.4240229205333567e-10
E_gs: -0.3451567772673932
test mps sampling took: (0.001287221908569336, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 21

```

shots per matrix element: 250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.054824535818091616
1 Execution time: 0:00:58.949569 ovlp:
(0.999984+0.0082720000000000057j)
2 Execution time: 0:00:58.951556 ovlp:
(0.99976+0.014575999999999922j)
3 Execution time: 0:00:58.954139 ovlp:
(0.999504+0.013992000000000004j)
4 Execution time: 0:00:58.957359 ovlp:
(0.9990239999999999+0.027376000000000067j)
5 Execution time: 0:00:58.961294 ovlp:
(0.9988079999999999+0.03034399999999927j)
6 Execution time: 0:00:58.965865 ovlp:
(0.9981439999999999+0.034712000000000076j)
7 Execution time: 0:00:58.971050 ovlp:
(0.997352+0.045968000000000001j)
8 Execution time: 0:00:58.978161 ovlp:
(0.996408+0.052912000000000007j)
9 Execution time: 0:00:58.985904 ovlp:
(0.995568+0.058432000000000004j)
10 Execution time: 0:00:58.993655 ovlp:
(0.9947919999999999+0.061520000000000002j)
11 Execution time: 0:00:59.001760 ovlp:
(0.993552+0.072680000000000008j)
12 Execution time: 0:00:59.010423 ovlp:
(0.992248+0.076200000000000005j)
13 Execution time: 0:00:59.019975 ovlp:
(0.9910079999999999+0.087288000000000003j)
14 Execution time: 0:00:59.030052 ovlp:
(0.989888000000000001+0.090608000000000002j)
15 Execution time: 0:00:59.042612 ovlp:
(0.987976+0.094079999999999994j)
16 Execution time: 0:00:59.054380 ovlp:
(0.9861359999999999+0.10564799999999996j)
17 Execution time: 0:00:59.067012 ovlp:
(0.984560000000000001+0.10541599999999995j)
18 Execution time: 0:00:59.080632 ovlp:
(0.983144+0.112303999999999996j)
19 Execution time: 0:00:59.094182 ovlp: (0.98096+0.117928000000000003j)
20 Execution time: 0:00:59.108406 ovlp:
(0.978432+0.123167999999999994j)
x_points = [np.float64(0.0), np.float64(0.054824535818091616),
np.float64(0.10964907163618323), np.float64(0.16447360745427486),
np.float64(0.21929814327236646), np.float64(0.27412267909045807),
np.float64(0.3289472149085497), np.float64(0.3837717507266413),
np.float64(0.4385962865447329), np.float64(0.49342082236282453),


```

np.float64(0.5482453581809161), np.float64(0.6030698939990078),
np.float64(0.6578944298170994), np.float64(0.712718965635191),
np.float64(0.7675435014532827), np.float64(0.8223680372713742),
np.float64(0.8771925730894659), np.float64(0.9320171089075575),
np.float64(0.9868416447256491), np.float64(1.0416661805437406),
np.float64(1.0964907163618323)] y_points = [1.          +0.j
0.999984      +0.008272000000000006j
0.99976       +0.014575999999999992j
0.999504      +0.013992j
0.9990239999999999+0.027376000000000007j
0.9988079999999999+0.030343999999999993j
0.9981439999999999+0.034712000000000008j
0.997352      +0.045968000000000001j
0.996408      +0.052912000000000007j
0.995568      +0.058432000000000004j
0.9947919999999999+0.061520000000000002j
0.993552      +0.072680000000000008j
0.992248      +0.076200000000000005j
0.9910079999999999+0.087288000000000003j
0.9898880000000000+0.090608000000000002j
0.987976      +0.094079999999999994j
0.9861359999999999+0.105647999999999996j
0.9845600000000000+0.105415999999999995j
0.983144      +0.112303999999999996j
0.98096       +0.117928000000000003j
0.978432      +0.123167999999999994j]
fit1: [ 0.38675585557759695 -0.3037377685512815 ]
[ 0.38675585557759695 -0.3037377685512815  0.38676585547759695
 -0.          ] 9.44532158925123e-10
[ 2.8958304267537061e-01 -3.4707932388734897e-01
 2.9802066705977670e-01
 -5.8014645178053451e-02  4.4195697076612341e-06]
9.525706290298926e-10
E_gs: -0.34707932388734897
test mps sampling took: (0.0013153553009033203, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2240007576669376
1 Execution time: 0:00:59.658660 ovlp:
(0.998988+0.025463999999999993j)
2 Execution time: 0:00:59.660810 ovlp:
(0.9964280000000000+0.050712000000000009j)
3 Execution time: 0:00:59.663576 ovlp:
(0.9916799999999999+0.076975999999999993j)
4 Execution time: 0:00:59.666776 ovlp:
(0.986224+0.101644000000000007j)

```

```

5 Execution time: 0:00:59.670684  ovlp:
(0.97790400000000001+0.12682400000000005j)
6 Execution time: 0:00:59.676112  ovlp: (0.968688+0.15487199999999999j)
7 Execution time: 0:00:59.682289  ovlp: (0.957524+0.17450800000000001j)
8 Execution time: 0:00:59.688646  ovlp:
(0.94488400000000001+0.19812399999999997j)
9 Execution time: 0:00:59.695290  ovlp:
(0.93151199999999999+0.21885200000000005j)
10 Execution time: 0:00:59.702768  ovlp:
(0.915648+0.23941199999999996j)
x_points = [np.float64(0.0), np.float64(0.2240007576669376),
np.float64(0.4480015153338752), np.float64(0.6720022730008128),
np.float64(0.8960030306677504), np.float64(1.120003788334688),
np.float64(1.3440045460016257), np.float64(1.5680053036685633),
np.float64(1.7920060613355009), np.float64(2.0160068190024383),
np.float64(2.240007576669376)] y_points = [1.          +0.j
0.998988      +0.025463999999999993j
0.99642800000000001+0.050712000000000009j
0.99167999999999999+0.076975999999999993j
0.986224      +0.101644000000000007j
0.97790400000000001+0.12682400000000005j
0.968688      +0.15487199999999999j
0.957524      +0.17450800000000001j
0.94488400000000001+0.19812399999999997j
0.93151199999999999+0.21885200000000005j
0.915648      +0.23941199999999996j]
fit1: [ 0.3884654472761908 -0.29923519345146504]
[ 0.3884654472761908 -0.29923519345146504 0.3884754471761908
-0.          ] 4.6732141525056996e-11
[ 2.8679079885124559e-01 -3.4203088017840055e-01
2.9343008070633375e-01
-6.4416335567666905e-02 3.8867353102262645e-06]
4.436571809929253e-11
E_gs: -0.34203088017840055
test mps sampling took: (0.0012743473052978516, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.24658894245344093
1 Execution time: 0:01:00.208216  ovlp:
(0.9990431986604782+0.02897544056561685j)
2 Execution time: 0:01:00.210205  ovlp:
(0.9957495940494316+0.058627082077914894j)
3 Execution time: 0:01:00.213346  ovlp:
(0.9903583865017411+0.0858315201641282j)
4 Execution time: 0:01:00.216895  ovlp:
(0.9832559765583673+0.11475636065890482j)

```

5 Execution time: 0:01:00.221285 ovlp:
(0.9730255622357871+0.14093959731543615j)
6 Execution time: 0:01:00.226004 ovlp:
(0.9621603470244859+0.1654576316406844j)
7 Execution time: 0:01:00.231499 ovlp:
(0.9488295283613397+0.1946400724961015j)
8 Execution time: 0:01:00.237441 ovlp:
(0.933161906426669+0.2172445041423059j)
9 Execution time: 0:01:00.244117 ovlp:
(0.9163442828819961+0.23678533149946412j)
10 Execution time: 0:01:00.251447 ovlp:
(0.8985514579720411+0.2564917590884628j)
11 Execution time: 0:01:00.259400 ovlp:
(0.8784586298420818+0.2792249909149873j)
12 Execution time: 0:01:00.267941 ovlp:
(0.8593502030902844+0.2957022139830996j)
13 Execution time: 0:01:00.277500 ovlp:
(0.8357521700530381+0.31100183540256965j)
14 Execution time: 0:01:00.287498 ovlp:
(0.8145001403001964+0.32884986038980446j)
15 Execution time: 0:01:00.298172 ovlp:
(0.789282904996067+0.33962307547230575j)
16 Execution time: 0:01:00.309669 ovlp:
(0.7647924707094589+0.3521258929762501j)
17 Execution time: 0:01:00.321620 ovlp:
(0.7418476385866941+0.3619239066934694j)
18 Execution time: 0:01:00.334227 ovlp:
(0.7144316002042403+0.36716791403507965j)
19 Execution time: 0:01:00.347399 ovlp:
(0.6908795672313941+0.37499712499597493j)
20 Execution time: 0:01:00.361494 ovlp:
(0.6671435340009475+0.37615632661885723j)
21 Execution time: 0:01:00.376158 ovlp:
(0.6396814955540937+0.3763679269150977j)
22 Execution time: 0:01:00.391677 ovlp:
(0.6180614652860514+0.3758895262453368j)
23 Execution time: 0:01:00.407546 ovlp:
(0.5950614330860062+0.3768371275719786j)
x_points = [np.float64(0.0), np.float64(0.24658894245344093),
np.float64(0.49317788490688186), np.float64(0.7397668273603228),
np.float64(0.9863557698137637), np.float64(1.2329447122672046),
np.float64(1.4795336547206457), np.float64(1.7261225971740866),
np.float64(1.9727115396275274), np.float64(2.2193004820809685),
np.float64(2.465889424534409), np.float64(2.7124783669878503),
np.float64(2.9590673094412914), np.float64(3.205656251894732),
np.float64(3.452245194348173), np.float64(3.6988341368016138),
np.float64(3.945423079255055), np.float64(4.1920120217084955),

```

np.float64(4.438600964161937), np.float64(4.685189906615378),
np.float64(4.931778849068818), np.float64(5.17836779152226),
np.float64(5.4249567339757006), np.float64(5.671545676429141)] y_points
= [1.          +0.j
0.9990431986604782+0.02897544056561685j
0.9957495940494316+0.05862708207791489j
0.9903583865017411+0.0858315201641282j
0.9832559765583673+0.11475636065890482j
0.9730255622357871+0.14093959731543615j
0.9621603470244859+0.1654576316406844j
0.9488295283613397+0.1946400724961015j
0.933161906426669 +0.2172445041423059j
0.9163442828819961+0.23678533149946412j
0.8985514579720411+0.2564917590884628j
0.8784586298420818+0.2792249909149873j
0.8593502030902844+0.2957022139830996j
0.8357521700530381+0.31100183540256965j
0.8145001403001964+0.32884986038980446j
0.789282904996067 +0.33962307547230575j
0.7647924707094589+0.3521258929762501j
0.7418476385866941+0.3619239066934694j
0.7144316002042403+0.36716791403507965j
0.6908795672313941+0.37499712499597493j
0.6671435340009475+0.37615632661885723j
0.6396814955540937+0.3763679269150977j
0.6180614652860514+0.3758895262453368j
0.5950614330860062+0.3768371275719786j ]
fit1: [ 0.3810172181406729 -0.29392439167351025]
[ 0.3110436543098155 -0.3293731327325597  0.37916815639221113
-0.03566305181659991] 1.9061796846831856e-09
[ 0.29581650113790814 -0.33725605292635535  0.2875284538490943
-0.05374155773528281 -0.00319395485924799] 1.4401825546493172e-09
E_gs: -0.33725605292635535
test mps sampling took: (0.0012536048889160156, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.012625814297501748
1 Execution time: 0:01:00.926892 ovlp: (1+0.0032794111499978573j)
2 Execution time: 0:01:00.929402 ovlp:
(0.99999239997416+0.0025194085659892007j)
3 Execution time: 0:01:00.932308 ovlp:
(0.9999771999224798+0.002831009625432701j)
4 Execution time: 0:01:00.936859 ovlp:
(0.9999771999224798+0.004837416447216025j)
5 Execution time: 0:01:00.941804 ovlp:
(0.9999239997415992+0.004328214715930034j)

```

```

6 Execution time: 0:01:00.946698  ovlp:
(0.9998479994831981+0.007330224922764694j)
7 Execution time: 0:01:00.952023  ovlp:
(0.9998175993798379+0.011654639625774621j)
8 Execution time: 0:01:00.958959  ovlp:
(0.9997719992247973+0.011145437894488852j)
9 Execution time: 0:01:00.965816  ovlp:
(0.9997415991214371+0.012483042442344328j)
10 Execution time: 0:01:00.974306  ovlp:
(0.9996959989663965+0.013987847558681654j)
11 Execution time: 0:01:00.984125  ovlp:
(0.9996427987855159+0.013182244819632372j)
12 Execution time: 0:01:00.994409  ovlp:
(0.9995895986046353+0.018426262649293035j)
13 Execution time: 0:01:01.004041  ovlp:
(0.9993387977519124+0.016951857636315903j)
14 Execution time: 0:01:01.015689  ovlp:
(0.999391997932793+0.020630270142918405j)
15 Execution time: 0:01:01.026752  ovlp:
(0.9994223980361534+0.021458672959488112j)
16 Execution time: 0:01:01.038286  ovlp:
(0.9993387977519124+0.023411879600390595j)
17 Execution time: 0:01:01.052229  ovlp:
(0.9992019972867907+0.025251085853691846j)
18 Execution time: 0:01:01.069560  ovlp:
(0.9990499967699891+0.028845898076053533j)
19 Execution time: 0:01:01.089105  ovlp:
(0.9990727968475093+0.03204550895473046j)
x_points = [np.float64(0.0), np.float64(0.012625814297501748),
np.float64(0.025251628595003496), np.float64(0.03787744289250525),
np.float64(0.05050325719000699), np.float64(0.06312907148750874),
np.float64(0.0757548857850105), np.float64(0.08838070008251224),
np.float64(0.10100651438001398), np.float64(0.11363232867751573),
np.float64(0.12625814297501747), np.float64(0.13888395727251923),
np.float64(0.151509771570021), np.float64(0.16413558586752272),
np.float64(0.17676140016502448), np.float64(0.1893872144625262),
np.float64(0.20201302876002797), np.float64(0.21463884305752973),
np.float64(0.22726465735503146), np.float64(0.23989047165253322)]
y_points = [1.          +0.j
1.          +0.00327941114999786j
0.99999239997416  +0.0025194085659892j
0.9999771999224798+0.0028310096254327j
0.9999771999224798+0.00483741644721603j
0.9999239997415992+0.00432821471593003j
0.9998479994831981+0.00733022492276469j
0.9998175993798379+0.01165463962577462j
0.9997719992247973+0.01114543789448885j

```

```

0.9997415991214371+0.01248304244234433j
0.9996959989663965+0.01398784755868165j
0.9996427987855159+0.01318224481963237j
0.9995895986046353+0.01842626264929303j
0.9993387977519124+0.0169518576363159j
0.999391997932793 +0.02063027014291841j
0.9994223980361534+0.02145867295948811j
0.9993387977519124+0.02341187960039059j
0.9992019972867907+0.02525108585369185j
0.9990499967699891+0.02884589807605353j
0.9990727968475093+0.03204550895473046j]
fit1: [ 0.4885723767382487 -0.2442753705180914]
[ 0.4885723767382487 -0.2442753705180914 0.4885823766382487
-0.          ] 2.3529597674397137e-10
[ 4.2369941403245343e-01 -2.1175630174284388e-01
4.2379627422241395e-01
-7.7203802402544791e-02 1.3250304267150361e-06]
2.8317137715971723e-10
E_gs: -0.21175630174284388
test mps sampling took: (0.0012891292572021484, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.057364008554909356
1 Execution time: 0:01:01.419458 ovlp:
(0.99993519997408+0.007395602958241154j)
2 Execution time: 0:01:01.421372 ovlp:
(0.99980319992128+0.012879605151842055j)
3 Execution time: 0:01:01.423946 ovlp:
(0.9994431997772799+0.019126807650723165j)
4 Execution time: 0:01:01.427844 ovlp:
(0.9990351996140798+0.027531611012644452j)
5 Execution time: 0:01:01.432159 ovlp:
(0.9985695994278398+0.033090013236005245j)
6 Execution time: 0:01:01.437724 ovlp:
(0.9979407991763196+0.04144681657872673j)
x_points = [np.float64(0.0), np.float64(0.057364008554909356),
np.float64(0.11472801710981871), np.float64(0.17209202566472806),
np.float64(0.22945603421963742), np.float64(0.28682004277454676),
np.float64(0.3441840513294561)] y_points = [1.          +0.j
0.99993519997408 +0.00739560295824115j
0.99980319992128 +0.01287960515184206j
0.9994431997772799+0.01912680765072317j
0.9990351996140798+0.02753161101264445j
0.9985695994278398+0.03309001323600524j
0.9979407991763196+0.04144681657872673j]
fit1: [ 0.28654915400687814 -0.4307795876444287 ]

```

```

[ 0.28654915400687814 -0.4307795876444287  0.28655915390687814
 -0.          ] 2.8690668186335013e-11
[ 2.4906077867104540e-01 -3.7444670959860604e-01
 2.4904735303615091e-01
 -1.4139182774013781e-01  1.3101687237590469e-06]
1.7282750673865448e-10
E_gs: -0.37444670959860604
test mps sampling took: (0.0013048648834228516, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.01061249562067745
1 Execution time: 0:01:01.749498 ovlp:
(0.9999943999944001-0.0001190001190001233j)
2 Execution time: 0:01:01.751376 ovlp:
(0.9999971999971999+0.001754201754201823j)
3 Execution time: 0:01:01.754649 ovlp:
(0.9999859999859999+0.0029862029862028905j)
4 Execution time: 0:01:01.758169 ovlp:
(0.9999691999692+0.00599340599340592j)
5 Execution time: 0:01:01.762667 ovlp:
(0.9999467999467999+0.005985005985005953j)
6 Execution time: 0:01:01.767291 ovlp:
(0.9999159999159999+0.007592207592207689j)
7 Execution time: 0:01:01.772959 ovlp:
(0.9999383999384+0.009191009191009236j)
x_points = [np.float64(0.0), np.float64(0.01061249562067745),
np.float64(0.0212249912413549), np.float64(0.031837486862032346),
np.float64(0.04244499824827098), np.float64(0.05306247810338725),
np.float64(0.06367497372406469), np.float64(0.07428746934474215)]
y_points = [1.          +0.j
0.9999943999944001-0.00011900011900012j
0.9999971999971999+0.00175420175420182j
0.9999859999859999+0.00298620298620289j
0.9999691999692 +0.00599340599340592j
0.9999467999467999+0.00598500598500595j
0.9999159999159999+0.00759220759220769j
0.9999383999384 +0.00919100919100924j]
fit1: [ 0.10601454938796273 -1.5381213669512148 ]
[ 0.10601454938796273 -1.5381213669512148  0.10602454928796273
 -0.          ] 1.1753171391728153e-10
[ 9.637120155491878e-02 -1.398227534077594e+00
 9.637927807759158e-02
 -5.854777415516176e-01  9.098936372432857e-07]
7.695089137641047e-10
E_gs: -1.398227534077594
test mps sampling took: (0.0013294219970703125, Counter({2: 7, 0: 3}))

```

truncated ham size: 12 Number of fitting points: 18

shots per matrix element: 294117.0

Total gate count: 224 2 qubit gates: 120

N gate: 224 dt: 0.16402177328649678

1 Execution time: 0:01:01.939361 ovlp:

(0.9994967988929575+0.020206244453737865j)

2 Execution time: 0:01:01.941277 ovlp:

(0.9981095958411108+0.03750548251206154j)

3 Execution time: 0:01:01.943866 ovlp:

(0.9955731902610185+0.05333591733901821j)

4 Execution time: 0:01:01.947170 ovlp:

(0.9923907832597232+0.07627916781416921j)

5 Execution time: 0:01:01.951035 ovlp:

(0.9881067738349025+0.09640721209586656j)

6 Execution time: 0:01:01.955658 ovlp:

(0.9827959621511166+0.11527045359499799j)

7 Execution time: 0:01:01.960944 ovlp:

(0.9768595490910079+0.1321616907557197j)

8 Execution time: 0:01:01.966833 ovlp:

(0.9699643339215347+0.15010013022028645j)

9 Execution time: 0:01:01.973386 ovlp:

(0.9616411156104543+0.16578776473308232j)

10 Execution time: 0:01:01.980747 ovlp:

(0.9537394982268961+0.18356980385356847j)

11 Execution time: 0:01:01.988723 ovlp:

(0.9444982778962114+0.2014198431236549j)

12 Execution time: 0:01:01.997380 ovlp:

(0.934706256353764+0.2161826756018863j)

13 Execution time: 0:01:02.006564 ovlp:

(0.92355423181931+0.2281507019315443j)

14 Execution time: 0:01:02.018099 ovlp:

(0.911586205489652+0.24432793752146265j)

15 Execution time: 0:01:02.029422 ovlp:

(0.8991353780978317+0.2570643655416043j)

16 Execution time: 0:01:02.040935 ovlp:

(0.8870993516185735+0.27335040137088296j)

17 Execution time: 0:01:02.053129 ovlp:

(0.8712009166420167+0.28504642710213957j)

x_points = [np.float64(0.0), np.float64(0.16402177328649678),

np.float64(0.32804354657299356), np.float64(0.4920653198594903),

np.float64(0.6560870931459871), np.float64(0.8201088664324839),

np.float64(0.9841306397189806), np.float64(1.1481524130054774),

np.float64(1.3121741862919742), np.float64(1.476195959578471),

np.float64(1.6402177328649679), np.float64(1.8042395061514647),

np.float64(1.9682612794379613), np.float64(2.1322830527244583),

np.float64(2.296304826010955), np.float64(2.460326599297452),

np.float64(2.6243483725839485), np.float64(2.788370145870445)] y_points


```

= [1.          +0.j
0.9994967988929575+0.02020624445373786j
0.9981095958411108+0.03750548251206154j
0.9955731902610185+0.05333591733901821j
0.9923907832597232+0.07627916781416921j
0.9881067738349025+0.09640721209586656j
0.9827959621511166+0.11527045359499799j
0.9768595490910079+0.1321616907557197j
0.9699643339215347+0.15010013022028645j
0.9616411156104543+0.16578776473308232j
0.9537394982268961+0.18356980385356847j
0.9444982778962114+0.2014198431236549j
0.934706256353764 +0.2161826756018863j
0.92355423181931 +0.2281507019315443j
0.911586205489652 +0.24432793752146265j
0.8991353780978317+0.2570643655416043j
0.8870993516185735+0.27335040137088296j
0.8712009166420167+0.28504642710213957j]
fit1: [ 0.3831217588317732 -0.3026964871169333]
[ 0.3831217588317732 -0.3026964871169333  0.3831317587317732
 -0.          ] 2.041638782378678e-10
[ 2.9402636494285256e-01 -3.4207506789352721e-01
 3.0029283235496007e-01
 -5.3601203838077822e-02  2.1539605022823175e-06]
1.6780839727998597e-10
E_gs: -0.3420750678935272
test mps sampling took: (0.0013294219970703125, Counter({0: 8, 2: 2}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.19009189699779175
1 Execution time: 0:01:02.581519 ovlp:
(0.9994375980878334+0.019079864871540453j)
2 Execution time: 0:01:02.583480 ovlp:
(0.9973779910851697+0.04609035670721284j)
3 Execution time: 0:01:02.586324 ovlp:
(0.9942011802840129+0.06509802133327258j)
4 Execution time: 0:01:02.589519 ovlp:
(0.9893827639013972+0.08498728895678243j)
5 Execution time: 0:01:02.593364 ovlp:
(0.9841539461234168+0.10969497296290798j)
6 Execution time: 0:01:02.598850 ovlp:
(0.9769567216528536+0.1317882480800434j)
7 Execution time: 0:01:02.604596 ovlp:
(0.9695922966138084+0.1489187063236015j)
8 Execution time: 0:01:02.611482 ovlp:
(0.9594158620139308+0.17324638903772271j)

```

```

9 Execution time: 0:01:02.618453  ovlp:
(0.949224227362373+0.18854524105381953j)
10 Execution time: 0:01:02.625822  ovlp:
(0.9381965898684055+0.2087689098142933j)
11 Execution time: 0:01:02.633846  ovlp:
(0.9254893466637786+0.22462256371671674j)
12 Execution time: 0:01:02.642588  ovlp:
(0.9128505036917125+0.2392070133038453j)
13 Execution time: 0:01:02.651944  ovlp:
(0.8976732520890571+0.2593166816767176j)
14 Execution time: 0:01:02.661922  ovlp:
(0.883818404982577+0.2738935312380062j)
15 Execution time: 0:01:02.672566  ovlp:
(0.8680331513127144+0.28847038079929477j)
16 Execution time: 0:01:02.684087  ovlp:
(0.8518222961958071+0.3022036274923334j)
17 Execution time: 0:01:02.696253  ovlp:
(0.8342206363501636+0.3150400711362418j)
18 Execution time: 0:01:02.709365  ovlp:
(0.8144605691659352+0.32574850754492557j)
19 Execution time: 0:01:02.722913  ovlp:
(0.7962281071755644+0.33695854565905514j)
x_points = [np.float64(0.0), np.float64(0.19009189699779175),
np.float64(0.3801837939955835), np.float64(0.5702756909933753),
np.float64(0.760367587991167), np.float64(0.9504594849889587),
np.float64(1.1405513819867505), np.float64(1.3306432789845422),
np.float64(1.520735175982334), np.float64(1.7108270729801258),
np.float64(1.9009189699779174), np.float64(2.0910108669757093),
np.float64(2.281102763973501), np.float64(2.471194660971293),
np.float64(2.6612865579690843), np.float64(2.851378454966876),
np.float64(3.041470351964668), np.float64(3.23156224896246),
np.float64(3.4216541459602516), np.float64(3.611746042958043)] y_points
= [1.          +0.j
0.9994375980878334+0.01907986487154045j
0.9973779910851697+0.04609035670721284j
0.9942011802840129+0.06509802133327258j
0.9893827639013972+0.08498728895678243j
0.9841539461234168+0.10969497296290798j
0.9769567216528536+0.1317882480800434j
0.9695922966138084+0.1489187063236015j
0.9594158620139308+0.17324638903772271j
0.949224227362373 +0.18854524105381953j
0.9381965898684055+0.2087689098142933j
0.9254893466637786+0.22462256371671674j
0.9128505036917125+0.2392070133038453j
0.8976732520890571+0.2593166816767176j
0.883818404982577 +0.2738935312380062j

```

```

0.8680331513127144+0.28847038079929477j
0.8518222961958071+0.3022036274923334j
0.8342206363501636+0.3150400711362418j
0.8144605691659352+0.32574850754492557j
0.7962281071755644+0.33695854565905514j]
fit1: [ 0.3812064935870736 -0.3022550270380576]
[ 0.3812064935870736 -0.3022550270380576  0.3812164934870736
-0.          ] 3.7201136008204944e-10
[ 2.908613812015153e-01 -3.433226197234312e-01
2.986402260507725e-01
-5.561761399547092e-02  2.450252392635153e-06]
2.709434829591057e-10
E_gs: -0.3433226197234312
test mps sampling took: (0.0013241767883300781, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.0630058865911051
1 Execution time: 0:01:03.114004  ovlp:
(0.9999359999999999+0.0085568000000000031j)
2 Execution time: 0:01:03.116010  ovlp:
(0.9996832+0.013286399999999992j)
3 Execution time: 0:01:03.118809  ovlp:
(0.999312+0.022367999999999994j)
4 Execution time: 0:01:03.122270  ovlp:
(0.9987968+0.029785600000000008j)
5 Execution time: 0:01:03.127002  ovlp:
(0.99832640000000001+0.037228800000000006j)
6 Execution time: 0:01:03.132267  ovlp:
(0.9976384+0.04288319999999999j)
7 Execution time: 0:01:03.137732  ovlp:
(0.9963776+0.052035199999999995j)
8 Execution time: 0:01:03.143773  ovlp:
(0.9954816+0.058454400000000002j)
x_points = [np.float64(0.0), np.float64(0.0630058865911051),
np.float64(0.1260117731822102), np.float64(0.1890176597733153),
np.float64(0.2520235463644204), np.float64(0.31502943295552555),
np.float64(0.3780353195466306), np.float64(0.44104120613773573),
np.float64(0.5040470927288409)] y_points = [1.          +0.j
0.9999359999999999+0.008556800000000003j
0.9996832          +0.013286399999999992j
0.999312           +0.022367999999999994j
0.9987968          +0.029785600000000008j
0.99832640000000001+0.037228800000000006j
0.9976384          +0.04288319999999999j
0.9963776          +0.052035199999999995j
0.9954816          +0.058454400000000002j]

```

```

fit1: [ 0.48935004483342653 -0.2443902647877972 ]
[ 0.48935004483342653 -0.2443902647877972  0.48936004473342654
-0.          ] 2.5598781933309118e-11
[ 4.1487408869418180e-01 -2.0708086603528353e-01
4.1501187443267307e-01
-8.3035255123404206e-02 1.5174592169521821e-06]
7.510658754860233e-11
E_gs: -0.20708086603528353
test mps sampling took: (0.0012805461883544922, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1315129660657881
1 Execution time: 0:01:03.552447  ovlp:
(0.9997191997191996+0.015287415287415396j)
2 Execution time: 0:01:03.554466  ovlp:
(0.9987471987471988+0.03103383103383095j)
3 Execution time: 0:01:03.557615  ovlp:
(0.9973647973647974+0.04562824562824552j)
4 Execution time: 0:01:03.561172  ovlp:
(0.995067995067995+0.05899505899505897j)
5 Execution time: 0:01:03.565627  ovlp:
(0.9925011925011924+0.07647307647307655j)
6 Execution time: 0:01:03.570342  ovlp:
(0.9891063891063892+0.09162909162909161j)
7 Execution time: 0:01:03.575759  ovlp:
(0.9850707850707852+0.10700110700110699j)
8 Execution time: 0:01:03.581993  ovlp:
(0.9801387801387802+0.12343872343872353j)
9 Execution time: 0:01:03.589566  ovlp:
(0.9752787752787753+0.13538353538353531j)
x_points = [np.float64(0.0), np.float64(0.1315129660657881),
np.float64(0.2630259321315762), np.float64(0.3945388981973643),
np.float64(0.5260518642631524), np.float64(0.6575648303289405),
np.float64(0.7890777963947286), np.float64(0.9205907624605167),
np.float64(1.0521037285263048), np.float64(1.183616694592093)] y_points
= [1.          +0.j
0.9997191997191996+0.0152874152874154j
0.9987471987471988+0.03103383103383095j
0.9973647973647974+0.04562824562824552j
0.995067995067995 +0.05899505899505897j
0.9925011925011924+0.07647307647307655j
0.9891063891063892+0.09162909162909161j
0.9850707850707852+0.10700110700110699j
0.9801387801387802+0.12343872343872353j
0.9752787752787753+0.13538353538353531j]
fit1: [ 0.3421845699528461 -0.3453183027003861]

```

```

[ 0.3421845699528461 -0.3453183027003861 0.3421945698528461
 -0.          ] 1.7719453285258474e-10
[ 2.6252642466266196e-01 -3.4682731331811661e-01
 2.8998024412506701e-01
 -9.1570847903117258e-02 1.6457030986641475e-06]
3.792670812201479e-11
E_gs: -0.3468273133181166
test mps sampling took: (0.0012950897216796875, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 10
shots per matrix element: 555555.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.21549297403737253
1 Execution time: 0:01:04.097531 ovlp:
(0.999067599067599+0.02510822510822508j)
2 Execution time: 0:01:04.099508 ovlp:
(0.9966699966699966+0.05084105084105084j)
3 Execution time: 0:01:04.102868 ovlp:
(0.9927135927135926+0.07414027414027413j)
4 Execution time: 0:01:04.106494 ovlp:
(0.9867735867735867+0.10018630018630015j)
5 Execution time: 0:01:04.110608 ovlp:
(0.9798867798867799+0.1201195201195202j)
6 Execution time: 0:01:04.116091 ovlp:
(0.9706383706383706+0.1453807453807454j)
7 Execution time: 0:01:04.122338 ovlp:
(0.9603747603747603+0.16863316863316857j)
8 Execution time: 0:01:04.128557 ovlp:
(0.9495567495567496+0.19133119133119125j)
9 Execution time: 0:01:04.135740 ovlp:
(0.9354627354627354+0.21121761121761118j)
x_points = [np.float64(0.0), np.float64(0.21549297403737253),
np.float64(0.43098594807474505), np.float64(0.6464789221121175),
np.float64(0.8619718961494901), np.float64(1.0774648701868625),
np.float64(1.292957844224235), np.float64(1.5084508182616077),
np.float64(1.7239437922989802), np.float64(1.9394367663363528)]
y_points = [1.          +0.j
0.999067599067599 +0.02510822510822508j
0.9966699966699966+0.05084105084105084j
0.9927135927135926+0.07414027414027413j
0.9867735867735867+0.10018630018630015j
0.9798867798867799+0.1201195201195202j
0.9706383706383706+0.1453807453807454j
0.9603747603747603+0.16863316863316857j
0.9495567495567496+0.19133119133119125j
0.9354627354627354+0.21121761121761118j]
fit1: [ 0.3828186381907818 -0.3011500648381192]
[ 0.3828186381907818 -0.3011500648381192 0.3828286380907818

```

```

-0.          ] 1.9162352318471663e-11
[ 2.8340341240284717e-01 -3.4537207242960494e-01
2.9483412864560105e-01
-6.0540258019527546e-02  4.7599751312596722e-06]
2.2704512721903297e-11
E_gs: -0.34537207242960494
test mps sampling took: (0.001268148422241211, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.0822036709399744
1 Execution time: 0:01:04.686941 ovlp:
(0.9998991998992+0.01144221144221147j)
2 Execution time: 0:01:04.688919 ovlp:
(0.9995827995827995+0.015975415975415963j)
3 Execution time: 0:01:04.691505 ovlp:
(0.999045199045199+0.028998228998228903j)
4 Execution time: 0:01:04.694868 ovlp:
(0.9980679980679981+0.039291039291039276j)
5 Execution time: 0:01:04.698863 ovlp:
(0.9970599970599971+0.04834344834344839j)
6 Execution time: 0:01:04.703546 ovlp:
(0.995841995841996+0.05637105637105644j)
7 Execution time: 0:01:04.708933 ovlp:
(0.9939239939239939+0.0668850668850669j)
x_points = [np.float64(0.0), np.float64(0.0822036709399744),
np.float64(0.1644073418799488), np.float64(0.2466110128199232),
np.float64(0.3288146837598976), np.float64(0.41101835469987197),
np.float64(0.4932220256398464), np.float64(0.5754256965798208)]
y_points = [1.          +0.j
0.9998991998992 +0.01144221144221147j
0.9995827995827995+0.01597541597541596j
0.999045199045199 +0.0289982289982289j
0.9980679980679981+0.03929103929103928j
0.9970599970599971+0.04834344834344839j
0.995841995841996 +0.05637105637105644j
0.9939239939239939+0.0668850668850669j ]
fit1: [ 0.27747828700130917 -0.4211503557922925 ]
[ 0.27747828700130917 -0.4211503557922925  0.27748828690130917
-0.          ] 7.98385160580271e-11
[ 2.4060703906174016e-01 -3.6497726330129743e-01
2.4065753529984221e-01
-1.3570038135042922e-01  1.3279491504985141e-06]
1.505608786281407e-10
E_gs: -0.3649772633012974
test mps sampling took: (0.0012748241424560547, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 9

```

```

shots per matrix element: 625000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2038479407537995
1 Execution time: 0:01:05.273372 ovlp:
(0.9992288+0.0238495999999999915j)
2 Execution time: 0:01:05.275317 ovlp:
(0.9970399999999999+0.046134399999999991j)
3 Execution time: 0:01:05.278874 ovlp:
(0.9935168000000001+0.07226880000000002j)
4 Execution time: 0:01:05.282518 ovlp:
(0.9881632+0.09351360000000009j)
5 Execution time: 0:01:05.287129 ovlp:
(0.9815263999999999+0.11583359999999998j)
6 Execution time: 0:01:05.291944 ovlp:
(0.9740416000000001+0.13944639999999997j)
7 Execution time: 0:01:05.297429 ovlp:
(0.9647744+0.16111680000000006j)
8 Execution time: 0:01:05.303477 ovlp:
(0.9539808000000001+0.17988479999999996j)
x_points = [np.float64(0.0), np.float64(0.2038479407537995),
np.float64(0.407695881507599), np.float64(0.6115438222613985),
np.float64(0.815391763015198), np.float64(1.0192397037689975),
np.float64(1.223087644522797), np.float64(1.4269355852765966),
np.float64(1.630783526030396)] y_points = [1.          +0.j
0.9992288      +0.023849599999999992j
0.9970399999999999+0.046134399999999991j
0.9935168000000001+0.07226880000000002j
0.9881632      +0.09351360000000009j
0.9815263999999999+0.11583359999999998j
0.9740416000000001+0.13944639999999997j
0.9647744      +0.16111680000000006j
0.9539808000000001+0.17988479999999996j]
fit1: [ 0.3904743174457904 -0.2960469896022111]
[ 0.3904743174457904 -0.2960469896022111 0.3904843173457904
-0.          ] 1.8705771124748886e-11
[ 3.0959526429962397e-01 -3.2985967242339032e-01
2.4362963307313987e-01
-5.7321125341272219e-02 2.2490159535753790e-06]
1.3249925752943837e-11
E_gs: -0.3298596724233903
test mps sampling took: (0.0012814998626708984, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.13440274467175575
1 Execution time: 0:01:05.855768 ovlp:
(0.9997055995878394+0.011707016389822966j)

```

2 Execution time: 0:01:05.857790 ovlp:
(0.9987395982354375+0.03018064225289918j)
3 Execution time: 0:01:05.860580 ovlp:
(0.9971111959556744+0.04312506037508457j)
4 Execution time: 0:01:05.863836 ovlp:
(0.9946731925424697+0.06241748738448227j)
5 Execution time: 0:01:05.867779 ovlp:
(0.9914899880859833+0.0789407105169948j)
6 Execution time: 0:01:05.872422 ovlp:
(0.9881687834362969+0.09455313237438534j)
7 Execution time: 0:01:05.877708 ovlp:
(0.9843507780910894+0.10372554521576327j)
8 Execution time: 0:01:05.883582 ovlp:
(0.9791619708267592+0.12095716934003709j)
9 Execution time: 0:01:05.890304 ovlp:
(0.9741663638329094+0.13841879378631128j)
10 Execution time: 0:01:05.898846 ovlp:
(0.9688303563624989+0.15092161129025583j)
11 Execution time: 0:01:05.908370 ovlp:
(0.9616635463289649+0.16667203334084668j)
12 Execution time: 0:01:05.917867 ovlp:
(0.9543955361537506+0.18578966010552422j)
13 Execution time: 0:01:05.929314 ovlp:
(0.9477715268801377+0.19306687029361846j)
14 Execution time: 0:01:05.941856 ovlp:
(0.9384703138584394+0.20747409046372667j)
15 Execution time: 0:01:05.954335 ovlp:
(0.9300799021118629+0.2201241081737515j)
16 Execution time: 0:01:05.967829 ovlp:
(0.9217262904168066+0.23080532312745228j)
17 Execution time: 0:01:05.980369 ovlp:
(0.9121030769443077+0.24206613889259443j)
18 Execution time: 0:01:05.993701 ovlp:
(0.9027742638839695+0.25770616078862507j)
19 Execution time: 0:01:06.007223 ovlp:
(0.8932982506175509+0.2663449728829621j)
20 Execution time: 0:01:06.023878 ovlp:
(0.8816970343758481+0.2791697908377071j)
21 Execution time: 0:01:06.039005 ovlp:
(0.8697278176189447+0.2888298043617261j)
22 Execution time: 0:01:06.054692 ovlp:
(0.858687802162923+0.2976710167394234j)
23 Execution time: 0:01:06.070916 ovlp:
(0.8471417859985004+0.30684342958080135j)
x_points = [np.float64(0.0), np.float64(0.13440274467175575),
np.float64(0.2688054893435115), np.float64(0.4032082340152673),
np.float64(0.537610978687023), np.float64(0.6720137233587787),


```

np.float64(0.8064164680305346), np.float64(0.9408192127022903),
np.float64(1.075221957374046), np.float64(1.2096247020458017),
np.float64(1.3440274467175575), np.float64(1.4784301913893132),
np.float64(1.6128329360610691), np.float64(1.7472356807328249),
np.float64(1.8816384254045806), np.float64(2.016041170076336),
np.float64(2.150443914748092), np.float64(2.284846659419848),
np.float64(2.4192494040916035), np.float64(2.5536521487633594),
np.float64(2.688054893435115), np.float64(2.822457638106871),
np.float64(2.9568603827786264), np.float64(3.0912631274503823)]
y_points = [1.          +0.j
0.9997055995878394+0.01170701638982297j
0.9987395982354375+0.03018064225289918j
0.9971111959556744+0.04312506037508457j
0.9946731925424697+0.06241748738448227j
0.9914899880859833+0.0789407105169948j
0.9881687834362969+0.09455313237438534j
0.9843507780910894+0.10372554521576327j
0.9791619708267592+0.12095716934003709j
0.9741663638329094+0.13841879378631128j
0.9688303563624989+0.15092161129025583j
0.9616635463289649+0.16667203334084668j
0.9543955361537506+0.18578966010552422j
0.9477715268801377+0.19306687029361846j
0.9384703138584394+0.20747409046372667j
0.9300799021118629+0.2201241081737515j
0.9217262904168066+0.23080532312745228j
0.9121030769443077+0.24206613889259443j
0.9027742638839695+0.25770616078862507j
0.8932982506175509+0.2663449728829621j
0.8816970343758481+0.2791697908377071j
0.8697278176189447+0.2888298043617261j
0.858687802162923 +0.2976710167394234j
0.8471417859985004+0.30684342958080135j]
fit1: [ 0.3863349976229214 -0.3005078616777543]
[ 0.3863349976229214 -0.3005078616777543  0.3863449975229214
 -0.          ] 1.1090973554601613e-09
[ 2.889074350758929e-01 -3.444489808921198e-01
 2.816662466087081e-01
 -6.264290118601436e-02  3.146338971327384e-06]
9.49895760544996e-10
E_gs: -0.3444489808921198
test mps sampling took: (0.0013017654418945312, Counter({0: 8, 2: 2}))
truncated ham size: 12 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.20763263368485652
1 Execution time: 0:01:06.451589 ovlp:

```

```

(0.9991719976815936+0.024138067586589207j)
2 Execution time: 0:01:06.453560 ovlp:
(0.996932791411816+0.050353340989354844j)
3 Execution time: 0:01:06.456203 ovlp:
(0.9930087804245853+0.07245020286056802j)
4 Execution time: 0:01:06.459545 ovlp:
(0.9885015678043898+0.09723987227164232j)
5 Execution time: 0:01:06.463527 ovlp:
(0.9813879478862542+0.11805513055436556j)
6 Execution time: 0:01:06.468145 ovlp:
(0.9728127238756268+0.1407927942198237j)
7 Execution time: 0:01:06.473395 ovlp:
(0.96299909639747+0.16373925846992377j)
8 Execution time: 0:01:06.479403 ovlp:
(0.9528398679516303+0.18592972060321777j)
9 Execution time: 0:01:06.486297 ovlp:
(0.9408734344456164+0.20803378249459104j)
10 Execution time: 0:01:06.493712 ovlp:
(0.9273445965648703+0.22344902565727187j)
11 Execution time: 0:01:06.501736 ovlp:
(0.9107485500959402+0.24472508523023873j)
12 Execution time: 0:01:06.511986 ovlp:
(0.8976157133239973+0.26057952962268294j)
13 Execution time: 0:01:06.522783 ovlp:
(0.8805660655849836+0.27850037980106346j)
14 Execution time: 0:01:06.534170 ovlp:
(0.8637972186322123+0.2952692267538348j)
15 Execution time: 0:01:06.545080 ovlp:
(0.8426579594422865+0.3096476670134676j)
16 Execution time: 0:01:06.556629 ovlp:
(0.827293116420726+0.3223413025556472j)
17 Execution time: 0:01:06.568698 ovlp:
(0.8054770553357549+0.3324285307998862j)
18 Execution time: 0:01:06.584494 ovlp:
(0.7875418051170544+0.3415365563023576j)
x_points = [np.float64(0.0), np.float64(0.20763263368485652),
np.float64(0.41526526736971303), np.float64(0.6228979010545695),
np.float64(0.8305305347394261), np.float64(1.0381631684242825),
np.float64(1.245795802109139), np.float64(1.4534284357939957),
np.float64(1.6610610694788521), np.float64(1.8686937031637085),
np.float64(2.076326336848565), np.float64(2.283958970533422),
np.float64(2.491591604218278), np.float64(2.6992242379031346),
np.float64(2.9068568715879914), np.float64(3.114489505272848),
np.float64(3.3221221389577043), np.float64(3.5297547726425607),
np.float64(3.737387406327417)] y_points = [1.          +0.j
0.9991719976815936+0.02413806758658921j
0.996932791411816 +0.05035334098935484j

```

0.9930087804245853+0.07245020286056802j
 0.9885015678043898+0.09723987227164232j
 0.9813879478862542+0.11805513055436556j
 0.9728127238756268+0.1407927942198237j
 0.96299909639747 +0.16373925846992377j
 0.9528398679516303+0.18592972060321777j
 0.9408734344456164+0.20803378249459104j
 0.9273445965648703+0.22344902565727187j
 0.9107485500959402+0.24472508523023873j
 0.8976157133239973+0.26057952962268294j
 0.8805660655849836+0.27850037980106346j
 0.8637972186322123+0.2952692267538348j
 0.8426579594422865+0.3096476670134676j
 0.827293116420726 +0.3223413025556472j
 0.8054770553357549+0.3324285307998862j
 0.7875418051170544+0.3415365563023576j]
 fit1: [0.3833761092000689 -0.2995230385514964]
 [3.8327526871806306e-01 -2.9936124577682965e-01
 3.8338605127030451e-01
 -3.0625600779860869e-04] 8.136432500964688e-10
 [2.7468166944388467e-01 -3.5056126482230582e-01
 3.0166962759394411e-01
 -6.9156056796204554e-02 -6.7883700792816071e-05]
 8.668266090003704e-11
 E_gs: -0.3505612648223058
 test mps sampling took: (0.0014348030090332031, Counter({0: 8, 2: 2}))
 truncated ham size: 12 Number of fitting points: 19
 shots per matrix element: 277777.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.031780033081628085
 1 Execution time: 0:01:07.004376 ovlp:
 (0.9999711999193597+0.003999611198911346j)
 2 Execution time: 0:01:07.006452 ovlp:
 (0.9999351998185595+0.005814016279245493j)
 3 Execution time: 0:01:07.009154 ovlp:
 (0.9998343995363188+0.012531635088578241j)
 4 Execution time: 0:01:07.012367 ovlp:
 (0.9997263992339178+0.009730827246316354j)
 5 Execution time: 0:01:07.016318 ovlp:
 (0.9995895988508767+0.018709252385906705j)
 6 Execution time: 0:01:07.021034 ovlp:
 (0.9993735982460752+0.019810855470395294j)
 7 Execution time: 0:01:07.026334 ovlp:
 (0.9990207972582323+0.02907008139622791j)
 8 Execution time: 0:01:07.032387 ovlp:
 (0.9988911968953513+0.030884486476562056j)
 9 Execution time: 0:01:07.039095 ovlp:

```
(0.9984591956857478+0.03461409691947148j)
10 Execution time: 0:01:07.046378 ovlp:
(0.998214395000306+0.03952451066862994j)
11 Execution time: 0:01:07.054488 ovlp:
(0.9977463936899023+0.04058291363215827j)
12 Execution time: 0:01:07.063160 ovlp:
(0.9976527934278216+0.043498921796981005j)
13 Execution time: 0:01:07.072526 ovlp:
(0.9970767918150172+0.04861813613078114j)
14 Execution time: 0:01:07.082506 ovlp:
(0.9965367903030129+0.04959013885238872j)
15 Execution time: 0:01:07.093294 ovlp:
(0.9959391886297282+0.05776936175421299j)
16 Execution time: 0:01:07.104817 ovlp:
(0.9954279871983642+0.06378137858786004j)
17 Execution time: 0:01:07.116947 ovlp:
(0.9951111863113218+0.06206777378976658j)
18 Execution time: 0:01:07.129819 ovlp:
(0.9942759839727551+0.07134139975591935j)
x_points = [np.float64(0.0), np.float64(0.031780033081628085),
np.float64(0.06356006616325617), np.float64(0.09534009924488426),
np.float64(0.12712013232651234), np.float64(0.15890016540814042),
np.float64(0.19068019848976853), np.float64(0.2224602315713966),
np.float64(0.2542402646530247), np.float64(0.28602029773465276),
np.float64(0.31780033081628084), np.float64(0.3495803638979089),
np.float64(0.38136039697953705), np.float64(0.41314043006116513),
np.float64(0.4449204631427932), np.float64(0.4767004962244213),
np.float64(0.5084805293060494), np.float64(0.5402605623876775),
np.float64(0.5720405954693055)] y_points = [1.          +0.j
0.9999711999193597+0.00399961119891135j
0.9999351998185595+0.00581401627924549j
0.9998343995363188+0.01253163508857824j
0.9997263992339178+0.00973082724631635j
0.9995895988508767+0.01870925238590671j
0.9993735982460752+0.01981085547039529j
0.9990207972582323+0.02907008139622791j
0.9988911968953513+0.03088448647656206j
0.9984591956857478+0.03461409691947148j
0.998214395000306 +0.03952451066862994j
0.9977463936899023+0.04058291363215827j
0.9976527934278216+0.043498921796981j
0.9970767918150172+0.04861813613078114j
0.9965367903030129+0.04959013885238872j
0.9959391886297282+0.05776936175421299j
0.9954279871983642+0.06378137858786004j
0.9951111863113218+0.06206777378976658j
0.9942759839727551+0.07134139975591935j]
```

fit1: [0.4373874048188487 -0.2729022224796432]
[0.4373874048188487 -0.2729022224796432 0.4373974047188487
-0.] 7.154116731328492e-10
[3.7591097184050409e-01 -2.3377255553886214e-01
3.7661403507761082e-01
-8.5583253212411295e-02 1.3804808236688947e-06]
8.497726969808278e-10
E_gs: -0.23377255553886214
test mps sampling took: (0.0013418197631835938, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.12809154490333632
1 Execution time: 0:01:07.665450 ovlp:
(0.9997871992764775+0.0155458528558996j)
2 Execution time: 0:01:07.667523 ovlp:
(0.9987687958139058+0.029727501073503637j)
3 Execution time: 0:01:07.670275 ovlp:
(0.9971651903616472+0.04339234753398169j)
4 Execution time: 0:01:07.673513 ovlp:
(0.9950675832297831+0.05945880215992738j)
5 Execution time: 0:01:07.677386 ovlp:
(0.9927647754002364+0.07532005608819059j)
6 Execution time: 0:01:07.682911 ovlp:
(0.9893143636688364+0.09041370740660515j)
7 Execution time: 0:01:07.688871 ovlp:
(0.9860843526867991+0.10369095254923866j)
8 Execution time: 0:01:07.695603 ovlp:
(0.9813495365884244+0.11686179733011093j)
9 Execution time: 0:01:07.702401 ovlp:
(0.9765995204383695+0.13411385598711045j)
10 Execution time: 0:01:07.710782 ovlp:
(0.9713935027379093+0.14403188970842495j)
11 Execution time: 0:01:07.720153 ovlp:
(0.9652982820141589+0.15942194203460303j)
12 Execution time: 0:01:07.729080 ovlp:
(0.9600010640036176+0.1718175841797862j)
13 Execution time: 0:01:07.738708 ovlp:
(0.951382634700958+0.18919124325022696j)
14 Execution time: 0:01:07.748836 ovlp:
(0.9445350114190387+0.19823527399993157j)
15 Execution time: 0:01:07.761506 ovlp:
(0.9374897874652774+0.2126677230702585j)
16 Execution time: 0:01:07.773396 ovlp:
(0.928894158240138+0.22102775149435505j)
17 Execution time: 0:01:07.785693 ovlp:
(0.9191357250614651+0.23495099883339599j)

```

18 Execution time: 0:01:07.800576  ovlp:
(0.9100156940533597+0.24694383960905464j)
19 Execution time: 0:01:07.814264  ovlp:
(0.901207264104698+0.258739079712871j)
x_points = [np.float64(0.0), np.float64(0.12809154490333632),
np.float64(0.25618308980667265), np.float64(0.384274634710009),
np.float64(0.5123661796133453), np.float64(0.6404577245166816),
np.float64(0.768549269420018), np.float64(0.8966408143233543),
np.float64(1.0247323592266906), np.float64(1.152823904130027),
np.float64(1.2809154490333632), np.float64(1.4090069939366996),
np.float64(1.537098538840036), np.float64(1.6651900837433722),
np.float64(1.7932816286467086), np.float64(1.9213731735500448),
np.float64(2.049464718453381), np.float64(2.1775562633567174),
np.float64(2.305647808260054), np.float64(2.43373935316339)] y_points =
[1.          +0.j
0.9997871992764775+0.0155458528558996j
0.9987687958139058+0.02972750107350364j
0.9971651903616472+0.04339234753398169j
0.9950675832297831+0.05945880215992738j
0.9927647754002364+0.07532005608819059j
0.9893143636688364+0.09041370740660515j
0.9860843526867991+0.10369095254923866j
0.9813495365884244+0.11686179733011093j
0.9765995204383695+0.13411385598711045j
0.9713935027379093+0.14403188970842495j
0.9652982820141589+0.15942194203460303j
0.9600010640036176+0.1718175841797862j
0.951382634700958 +0.18919124325022696j
0.9445350114190387+0.19823527399993157j
0.9374897874652774+0.2126677230702585j
0.928894158240138 +0.22102775149435505j
0.9191357250614651+0.23495099883339599j
0.9100156940533597+0.24694383960905464j
0.901207264104698 +0.258739079712871j ]
fit1: [ 0.38548275390473824 -0.3025964375658249 ]
[ 0.38548275390473824 -0.3025964375658249  0.38549275380473824
-0.          ] 1.246503374043678e-10
[ 2.5851418707523205e-01 -3.6076158984894346e-01
3.0632047765701798e-01
-7.8907097210690863e-02  2.8088641877137999e-07]
9.177936925159745e-11
E_gs: -0.36076158984894346
test mps sampling took: (0.0012879371643066406, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.045832537676107905

```

```
1 Execution time: 0:01:08.229508 ovlp:
(0.9999471998310394+0.0017688056601781188j)
2 Execution time: 0:01:08.231509 ovlp:
(0.9998679995775988+0.010375233200746292j)
3 Execution time: 0:01:08.234154 ovlp:
(0.9996919990143969+0.01524164877327605j)
4 Execution time: 0:01:08.237544 ovlp:
(0.9993663979724736+0.018216058291386616j)
5 Execution time: 0:01:08.241425 ovlp:
(0.9991023971276709+0.02922489351965929j)
6 Execution time: 0:01:08.246028 ovlp:
(0.9985655954099053+0.03509451230243932j)
7 Execution time: 0:01:08.251373 ovlp:
(0.9980287936921397+0.03566651413284516j)
8 Execution time: 0:01:08.257338 ovlp:
(0.9973071913830125+0.04769615262768845j)
9 Execution time: 0:01:08.264066 ovlp:
(0.9971135907634905+0.048760956035059255j)
10 Execution time: 0:01:08.271400 ovlp:
(0.9963567883417226+0.053160970115104345j)
11 Execution time: 0:01:08.279371 ovlp:
(0.9957407863705163+0.060825794642542785j)
12 Execution time: 0:01:08.287908 ovlp:
(0.9944295821746629+0.06490020768066462j)
13 Execution time: 0:01:08.297239 ovlp:
(0.993646379668415+0.0701274244077581j)
14 Execution time: 0:01:08.307272 ovlp:
(0.9928191770213666+0.07253863212362277j)
15 Execution time: 0:01:08.318000 ovlp:
(0.9907071702629449+0.08256186419796552j)
16 Execution time: 0:01:08.329308 ovlp:
(0.990328769052061+0.08184906191699803j)
17 Execution time: 0:01:08.341419 ovlp:
(0.9889119645182864+0.09162589320285819j)
18 Execution time: 0:01:08.354095 ovlp:
(0.9883223626315605+0.09417790136928428j)
19 Execution time: 0:01:08.370541 ovlp:
(0.9868879580414658+0.1009539230525538j)
20 Execution time: 0:01:08.385801 ovlp:
(0.9853127530008097+0.10838114681966982j)
21 Execution time: 0:01:08.403233 ovlp:
(0.9836143475659123+0.1125611601957126j)
22 Execution time: 0:01:08.421382 ovlp:
(0.9824439438206203+0.1160635714034286j)
x_points = [np.float64(0.0), np.float64(0.045832537676107905),
np.float64(0.09166507535221581), np.float64(0.13749761302832372),
np.float64(0.18333015070443162), np.float64(0.22916268838053952),
```

```

np.float64(0.27499522605664745), np.float64(0.32082776373275534),
np.float64(0.36666030140886324), np.float64(0.41249283908497114),
np.float64(0.45832537676107904), np.float64(0.5041579144371869),
np.float64(0.5499904521132949), np.float64(0.5958229897894027),
np.float64(0.6416555274655107), np.float64(0.6874880651416185),
np.float64(0.7333206028177265), np.float64(0.7791531404938344),
np.float64(0.8249856781699423), np.float64(0.8708182158460502),
np.float64(0.9166507535221581), np.float64(0.962483291198266),
np.float64(1.0083158288743739)] y_points = [1.          +0.j
0.9999471998310394+0.00176880566017812j
0.9998679995775988+0.01037523320074629j
0.9996919990143969+0.01524164877327605j
0.9993663979724736+0.01821605829138662j
0.9991023971276709+0.02922489351965929j
0.9985655954099053+0.03509451230243932j
0.9980287936921397+0.03566651413284516j
0.9973071913830125+0.04769615262768845j
0.9971135907634905+0.04876095603505926j
0.9963567883417226+0.05316097011510434j
0.9957407863705163+0.06082579464254279j
0.9944295821746629+0.06490020768066462j
0.993646379668415 +0.0701274244077581j
0.9928191770213666+0.07253863212362277j
0.9907071702629449+0.08256186419796552j
0.990328769052061 +0.08184906191699803j
0.9889119645182864+0.09162589320285819j
0.9883223626315605+0.09417790136928428j
0.9868879580414658+0.1009539230525538j
0.9853127530008097+0.10838114681966982j
0.9836143475659123+0.1125611601957126j
0.9824439438206203+0.1160635714034286j ]
fit1: [ 0.35533914576409187 -0.3314872644276884 ]
[ 0.35533914576409187 -0.3314872644276884  0.35534914566409187
-0.          ] 6.315081782461084e-10
[ 2.5808597237567971e-01 -3.5398401166677285e-01
2.9483396031408116e-01
-8.9398119745959029e-02  3.6006929224207785e-06]
5.900333403291934e-10
E_gs: -0.35398401166677285
test mps sampling took: (0.0013217926025390625, Counter({2: 10}))
truncated ham size: 12 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2507911860382921
1 Execution time: 0:01:08.992966 ovlp:
(0.9989248+0.029743999999999993j)
2 Execution time: 0:01:08.994919 ovlp:

```



```

(0.9955807999999999+0.0565632000000000036j)
3 Execution time: 0:01:08.998831 ovlp: (0.99020480000000001+0.0878816j)
4 Execution time: 0:01:09.002700 ovlp: (0.982688+0.114777600000000004j)
5 Execution time: 0:01:09.007995 ovlp:
(0.9726272+0.142531200000000008j)
6 Execution time: 0:01:09.012809 ovlp:
(0.96057600000000001+0.168540799999999994j)
7 Execution time: 0:01:09.019036 ovlp: (0.9472992+0.19165119999999999j)
8 Execution time: 0:01:09.025913 ovlp:
(0.9317375999999999+0.218172800000000006j)
x_points = [np.float64(0.0), np.float64(0.2507911860382921),
np.float64(0.5015823720765842), np.float64(0.7523735581148763),
np.float64(1.0031647441531684), np.float64(1.2539559301914605),
np.float64(1.5047471162297525), np.float64(1.7555383022680446),
np.float64(2.0063294883063367)] y_points = [1.          +0.j
0.9989248          +0.029743999999999999j
0.9955807999999999+0.056563200000000004j
0.99020480000000001+0.0878816j
0.982688          +0.114777600000000004j
0.9726272          +0.142531200000000008j
0.96057600000000001+0.168540799999999994j
0.9472992          +0.19165119999999999j
0.9317375999999999+0.218172800000000006j]
fit1: [ 0.3759493168637199 -0.30747655154067594]
[ 0.3759493168637199 -0.30747655154067594  0.3759593167637199
-0.          ] 1.2373696380585247e-11
[ 2.696958490407951e-01 -3.510273519377784e-01
2.897975469293509e-01
-7.324542714764394e-02  5.123361860061878e-06]
1.1411616532202356e-11
E_gs: -0.3510273519377784
test mps sampling took: (0.0012955665588378906, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.10188439403418446
1 Execution time: 0:01:09.579490 ovlp: (0.9997984+0.01213440000000001j)
2 Execution time: 0:01:09.581458 ovlp:
(0.9992255999999999+0.0230192000000000017j)
3 Execution time: 0:01:09.584229 ovlp:
(0.9983872+0.0345488000000000046j)
4 Execution time: 0:01:09.587452 ovlp:
(0.99701440000000001+0.046143999999999996j)
x_points = [np.float64(0.0), np.float64(0.10188439403418446),
np.float64(0.20376878806836893), np.float64(0.3056531821025534),
np.float64(0.40753757613673786)] y_points = [1.          +0.j
0.9997984          +0.01213440000000001j

```

```

0.9992255999999999+0.023019200000000002j
0.9983872      +0.034548800000000005j
0.99701440000000001+0.046143999999999996j]
fit1: [ 0.2819206110341261 -0.42290476017032663]
[ 0.2819206110341261 -0.42290476017032663 0.2819306109341261
-0.      ] 2.8089200042324583e-11
[ 2.4575291434994181e-01 -3.6864595880355649e-01
2.4576223424233345e-01
-1.3389031068523105e-01 1.2829138266292866e-06]
1.927649876835749e-10
E_gs: -0.3686459588035565
test mps sampling took: (0.0015325546264648438, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1083473074947744
1 Execution time: 0:01:10.021093  ovlp:
(0.9998279999999999+0.009255999999999931j)
2 Execution time: 0:01:10.023098  ovlp:
(0.9991319999999999+0.02307999999999999j)
3 Execution time: 0:01:10.026467  ovlp:
(0.99811200000000001+0.037560000000000004j)
4 Execution time: 0:01:10.030273  ovlp:
(0.99677600000000001+0.05173199999999989j)
5 Execution time: 0:01:10.035278  ovlp:
(0.994688+0.062540000000000004j)
6 Execution time: 0:01:10.040488  ovlp:
(0.99264400000000001+0.07454399999999994j)
7 Execution time: 0:01:10.046483  ovlp:
(0.9897119999999999+0.088032000000000011j)
8 Execution time: 0:01:10.053493  ovlp:
(0.9866159999999999+0.10113599999999989j)
9 Execution time: 0:01:10.060435  ovlp:
(0.9827999999999999+0.113844000000000006j)
10 Execution time: 0:01:10.069494  ovlp:
(0.97978800000000001+0.124648000000000009j)
x_points = [np.float64(0.0), np.float64(0.1083473074947744),
np.float64(0.2166946149895488), np.float64(0.32504192248432323),
np.float64(0.4333892299790976), np.float64(0.5417365374738721),
np.float64(0.6500838449686465), np.float64(0.7584311524634209),
np.float64(0.8667784599581952), np.float64(0.9751257674529696),
np.float64(1.0834730749477441)] y_points = [1.      +0.j
0.9998279999999999+0.009255999999999931j
0.9991319999999999+0.02307999999999999j
0.99811200000000001+0.037560000000000004j
0.99677600000000001+0.05173199999999989j
0.994688      +0.062540000000000004j

```

0.9926440000000001+0.07454399999999994j
 0.9897119999999999+0.08803200000000011j
 0.9866159999999999+0.10113599999999989j
 0.9827999999999999+0.11384400000000006j
 0.9797880000000001+0.12464800000000009j
 fit1: [0.3458482004124303 -0.33843550874909517]
 [0.3458482004124303 -0.33843550874909517 0.3458582003124303
 -0.] 1.378771968726657e-10
 [2.6149837013146199e-01 -3.3960348110544780e-01
 2.9086080506478351e-01
 -9.6150064780055486e-02 1.6414812013600493e-06]
 9.926933653956821e-11
 E_gs: -0.3396034811054478
 test mps sampling took: (0.0012898445129394531, Counter({0: 8, 2: 2}))
 truncated ham size: 12 Number of fitting points: 22
 shots per matrix element: 238095.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.030137036631416637
 1 Execution time: 0:01:10.568778 ovlp:
 (0.9999831999832001+0.004338604338604446j)
 2 Execution time: 0:01:10.570766 ovlp:
 (0.9999327999328+0.009445809445809417j)
 3 Execution time: 0:01:10.573521 ovlp:
 (0.9998655998655999+0.011058611058611056j)
 4 Execution time: 0:01:10.576745 ovlp:
 (0.9998067998067999+0.015435015435015353j)
 5 Execution time: 0:01:10.581186 ovlp:
 (0.9996807996807997+0.01904701904701911j)
 6 Execution time: 0:01:10.586640 ovlp:
 (0.9994203994203994+0.019903819903819953j)
 7 Execution time: 0:01:10.592746 ovlp:
 (0.9992271992271993+0.026934626934626893j)
 8 Execution time: 0:01:10.598833 ovlp:
 (0.999008799008799+0.02778302778302777j)
 9 Execution time: 0:01:10.605525 ovlp:
 (0.9986223986223985+0.03614943614943611j)
 10 Execution time: 0:01:10.612971 ovlp:
 (0.9986223986223985+0.03187383187383186j)
 11 Execution time: 0:01:10.621850 ovlp:
 (0.9981519981519982+0.03791343791343782j)
 12 Execution time: 0:01:10.633277 ovlp:
 (0.9978831978831979+0.042457842457842565j)
 13 Execution time: 0:01:10.644863 ovlp:
 (0.9974211974211975+0.04606144606144613j)
 14 Execution time: 0:01:10.656460 ovlp:
 (0.9969003969003969+0.047842247842247776j)
 15 Execution time: 0:01:10.668887 ovlp:

```
(0.9964383964383965+0.05161385161385157j)
16 Execution time: 0:01:10.681904  ovlp:
(0.9961443961443961+0.055839055839055796j)
17 Execution time: 0:01:10.694256  ovlp:
(0.9957495957495957+0.0587958587958588j)
18 Execution time: 0:01:10.709475  ovlp:
(0.9945651945651945+0.062475062475062515j)
19 Execution time: 0:01:10.723627  ovlp:
(0.9943887943887944+0.06664986664986672j)
20 Execution time: 0:01:10.738755  ovlp:
(0.9937167937167937+0.06939666939666944j)
21 Execution time: 0:01:10.755116  ovlp:
(0.9933219933219932+0.07698187698187708j)
x_points = [np.float64(0.0), np.float64(0.030137036631416637),
np.float64(0.06027407326283327), np.float64(0.09041110989424991),
np.float64(0.12054814652566655), np.float64(0.15068518315708318),
np.float64(0.18082221978849983), np.float64(0.21095925641991645),
np.float64(0.2410962930513331), np.float64(0.2712333296827497),
np.float64(0.30137036631416636), np.float64(0.331507402945583),
np.float64(0.36164443957699965), np.float64(0.3917814762084163),
np.float64(0.4219185128398329), np.float64(0.45205554947124954),
np.float64(0.4821925861026662), np.float64(0.5123296227340828),
np.float64(0.5424666593654994), np.float64(0.5726036959969161),
np.float64(0.6027407326283327), np.float64(0.6328777692597494)]
y_points = [1.          +0.j
0.9999831999832001+0.00433860433860445j
0.9999327999328  +0.00944580944580942j
0.9998655998655999+0.01105861105861106j
0.9998067998067999+0.01543501543501535j
0.9996807996807997+0.01904701904701911j
0.9994203994203994+0.01990381990381995j
0.9992271992271993+0.02693462693462689j
0.999008799008799 +0.02778302778302777j
0.9986223986223985+0.03614943614943611j
0.9986223986223985+0.03187383187383186j
0.9981519981519982+0.03791343791343782j
0.9978831978831979+0.04245784245784257j
0.9974211974211975+0.04606144606144613j
0.9969003969003969+0.04784224784224778j
0.9964383964383965+0.05161385161385157j
0.9961443961443961+0.0558390558390558j
0.9957495957495957+0.0587958587958588j
0.9945651945651945+0.06247506247506251j
0.9943887943887944+0.06664986664986672j
0.9937167937167937+0.06939666939666944j
0.9933219933219932+0.07698187698187708j]
fit1: [ 0.353322733020603 -0.3340032219200375]
```

```

[ 0.353322733020603 -0.3340032219200375 0.353332732920603
 -0.          ] 3.351460274244143e-10
[ 2.9879038534164604e-01 -2.8399796430586877e-01
 2.9782614021449250e-01
 -1.1074637358514113e-01 1.5900351583070777e-06]
3.3897798679004105e-10
E_gs: -0.28399796430586877
test mps sampling took: (0.001283407211303711, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.12975611400464387
1 Execution time: 0:01:11.515597 ovlp:
(0.9996959999999999+0.014457600000000007j)
2 Execution time: 0:01:11.518044 ovlp:
(0.9988543999999999+0.030620799999999989j)
3 Execution time: 0:01:11.521461 ovlp:
(0.9973344+0.045734399999999995j)
4 Execution time: 0:01:11.525185 ovlp:
(0.9952352+0.060028799999999999j)
5 Execution time: 0:01:11.530047 ovlp:
(0.99264320000000001+0.073657599999999999j)
6 Execution time: 0:01:11.534744 ovlp: (0.9891711999999999+0.0899584j)
7 Execution time: 0:01:11.541118 ovlp:
(0.9854848+0.102889599999999991j)
8 Execution time: 0:01:11.547554 ovlp:
(0.98078400000000001+0.119747199999999994j)
x_points = [np.float64(0.0), np.float64(0.12975611400464387),
np.float64(0.25951222800928775), np.float64(0.3892683420139316),
np.float64(0.5190244560185755), np.float64(0.6487805700232194),
np.float64(0.7785366840278632), np.float64(0.9082927980325071),
np.float64(1.038048912037151)] y_points = [1.          +0.j
0.9996959999999999+0.014457600000000007j
0.9988543999999999+0.030620799999999989j
0.9973344          +0.045734399999999995j
0.9952352          +0.060028799999999999j
0.99264320000000001+0.073657599999999999j
0.9891711999999999+0.0899584j
0.9854848          +0.102889599999999991j
0.98078400000000001+0.119747199999999994j]
fit1: [ 0.3384483616116969 -0.3437065759649007]
[ 0.3384483616116969 -0.3437065759649007 0.3384583615116969
 -0.          ] 3.794158164290232e-11
[ 2.7365405247745617e-01 -3.3482332030181849e-01
 2.7883948460067032e-01
 -8.5785027994880650e-02 1.6735573970607800e-06]
2.2369872552164646e-11

```

E_gs: -0.3348233203018185

test mps sampling took: (0.001295328140258789, Counter({2: 7, 0: 3}))

truncated ham size: 12 Number of fitting points: 19

shots per matrix element: 277777.0

Total gate count: 224 2 qubit gates: 120

N gate: 224 dt: 0.17371763789233263

1 Execution time: 0:01:11.975540 ovlp:

(0.9994527984678356+0.018205250974702825j)

2 Execution time: 0:01:11.978057 ovlp:

(0.9979911943753443+0.0390061092171059j)

3 Execution time: 0:01:11.980904 ovlp:

(0.9949599858879605+0.06332057729761642j)

4 Execution time: 0:01:11.984718 ovlp:

(0.9913095756668118+0.0777566177185296j)

5 Execution time: 0:01:11.989186 ovlp:

(0.9862335614539721+0.10004068011390421j)

6 Execution time: 0:01:11.994609 ovlp:

(0.9814023479265741+0.11847993174380878j)

7 Execution time: 0:01:12.000539 ovlp:

(0.9738855268794753+0.14062719375614252j)

8 Execution time: 0:01:12.007473 ovlp:

(0.9652023025664471+0.15677683897514916j)

9 Execution time: 0:01:12.014924 ovlp:

(0.9579950823862307+0.1734232855851996j)

10 Execution time: 0:01:12.022851 ovlp:

(0.9479222541823118+0.19364094219463812j)

11 Execution time: 0:01:12.031157 ovlp:

(0.9375830252324706+0.2104097891474097j)

12 Execution time: 0:01:12.040073 ovlp:

(0.9262141933997414+0.22735863660418243j)

13 Execution time: 0:01:12.049531 ovlp:

(0.9136573582406031+0.2420970778718181j)

14 Execution time: 0:01:12.059666 ovlp:

(0.9014389240289873+0.2560003168008871j)

15 Execution time: 0:01:12.072815 ovlp:

(0.8882700871562441+0.2721787621005338j)

16 Execution time: 0:01:12.084744 ovlp:

(0.8748204494972587+0.2839435950420661j)

17 Execution time: 0:01:12.098749 ovlp:

(0.8600892082497831+0.2948444255643916j)

18 Execution time: 0:01:12.111821 ovlp:

(0.8446955651475825+0.30772526163073266j)

x_points = [np.float64(0.0), np.float64(0.17371763789233263),
np.float64(0.34743527578466527), np.float64(0.5211529136769979),
np.float64(0.6948705515693305), np.float64(0.8685881894616632),
np.float64(1.0423058273539958), np.float64(1.2160234652463284),
np.float64(1.389741103138661), np.float64(1.5634587410309937),

```

np.float64(1.7371763789233263), np.float64(1.910894016815659),
np.float64(2.0846116547079916), np.float64(2.2583292926003242),
np.float64(2.432046930492657), np.float64(2.6057645683849895),
np.float64(2.779482206277322), np.float64(2.9531998441696548),
np.float64(3.1269174820619874)] y_points = [1.          +0.j
0.9994527984678356+0.01820525097470282j
0.9979911943753443+0.0390061092171059j
0.9949599858879605+0.06332057729761642j
0.9913095756668118+0.0777566177185296j
0.9862335614539721+0.10004068011390421j
0.9814023479265741+0.11847993174380878j
0.9738855268794753+0.14062719375614252j
0.9652023025664471+0.15677683897514916j
0.9579950823862307+0.1734232855851996j
0.9479222541823118+0.19364094219463812j
0.9375830252324706+0.2104097891474097j
0.9262141933997414+0.22735863660418243j
0.9136573582406031+0.2420970778718181j
0.9014389240289873+0.2560003168008871j
0.8882700871562441+0.2721787621005338j
0.8748204494972587+0.2839435950420661j
0.8600892082497831+0.2948444255643916j
0.8446955651475825+0.30772526163073266j]
fit1: [ 0.38402234820430886 -0.30045072613754775]
[ 0.38402234820430886 -0.30045072613754775  0.38403234810430886
 -0.          ] 3.242612301602551e-10
[ 2.9462535946672919e-01 -3.4104088271255234e-01
 3.1173052220653658e-01
 -5.1778094504706891e-02  2.5193669696829524e-06]
1.0623039842591513e-10
E_gs: -0.34104088271255234
test mps sampling took: (0.0012938976287841797, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2697679656436916
1 Execution time: 0:01:12.587450 ovlp: (0.99878+0.032540000000000001j)
2 Execution time: 0:01:12.589433 ovlp:
(0.994936+0.0623240000000000046j)
3 Execution time: 0:01:12.592111 ovlp: (0.98808800000000001+0.095132j)
4 Execution time: 0:01:12.595466 ovlp:
(0.97955600000000001+0.122935999999999993j)
5 Execution time: 0:01:12.599351 ovlp: (0.968464+0.15050800000000001j)
6 Execution time: 0:01:12.603904 ovlp: (0.95469200000000001+0.182736j)
7 Execution time: 0:01:12.609453 ovlp:
(0.939244+0.208056000000000002j)
8 Execution time: 0:01:12.615491 ovlp: (0.922388+0.233012j)

```

```

9 Execution time: 0:01:12.622474  ovlp:
(0.9008240000000001+0.25637599999999994j)
10 Execution time: 0:01:12.629832  ovlp:
(0.8796200000000001+0.27990399999999993j)
x_points = [np.float64(0.0), np.float64(0.2697679656436916),
np.float64(0.5395359312873832), np.float64(0.8093038969310749),
np.float64(1.0790718625747664), np.float64(1.348839828218458),
np.float64(1.6186077938621497), np.float64(1.8883757595058412),
np.float64(2.158143725149533), np.float64(2.4279116907932243),
np.float64(2.697679656436916)] y_points = [1.          +0.j
0.99878          +0.03254000000000001j
0.994936          +0.06232400000000005j
0.9880880000000001+0.095132j
0.9795560000000001+0.12293599999999993j
0.968464          +0.15050800000000001j
0.9546920000000001+0.182736j
0.939244          +0.20805600000000002j
0.922388          +0.233012j
0.9008240000000001+0.25637599999999994j
0.8796200000000001+0.27990399999999993j]
fit1: [ 0.3890167724884344 -0.2993287961724426]
[ 0.3890167724884344 -0.2993287961724426  0.3890267723884344
 -0.          ] 4.2594508575810024e-11
[ 3.0017211138806854e-01 -3.3966120116381671e-01
 2.9598319940495577e-01
 -5.0689344616251422e-02  3.1168567172404296e-06]
2.973513830174013e-11
E_gs: -0.3396612011638167
test mps sampling took: (0.0020029544830322266, Counter({2: 6, 0: 4}))
truncated ham size: 12  Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.10359312864536374
1 Execution time: 0:01:13.257724  ovlp:
(0.9998127998127999+0.013007813007813063j)
2 Execution time: 0:01:13.259796  ovlp:
(0.9990847990847991+0.0228098228098228j)
3 Execution time: 0:01:13.263274  ovlp:
(0.9984087984087984+0.03767663767663776j)
4 Execution time: 0:01:13.267752  ovlp:
(0.997009997009997+0.044982644982644926j)
5 Execution time: 0:01:13.271956  ovlp:
(0.995023595023595+0.060988260988261045j)
6 Execution time: 0:01:13.277614  ovlp:
(0.9935311935311935+0.0701662701662702j)
7 Execution time: 0:01:13.283739  ovlp:
(0.9909467909467911+0.08316628316628316j)

```



```

8 Execution time: 0:01:13.290595 ovlp:
(0.9878267878267879+0.09551629551629559j)
9 Execution time: 0:01:13.298267 ovlp:
(0.9845299845299846+0.1084331084331085j)
10 Execution time: 0:01:13.306899 ovlp:
(0.9815919815919816+0.12096512096512102j)
11 Execution time: 0:01:13.315695 ovlp:
(0.9768235768235769+0.12874952874952883j)
12 Execution time: 0:01:13.324781 ovlp:
(0.9731783731783732+0.13932113932113932j)
13 Execution time: 0:01:13.334315 ovlp:
(0.9684151684151685+0.15105235105235115j)
x_points = [np.float64(0.0), np.float64(0.10359312864536374),
np.float64(0.20718625729072748), np.float64(0.3107793859360912),
np.float64(0.41437251458145496), np.float64(0.5179656432268187),
np.float64(0.6215587718721824), np.float64(0.7251519005175462),
np.float64(0.8287450291629099), np.float64(0.9323381578082737),
np.float64(1.0359312864536374), np.float64(1.1395244150990012),
np.float64(1.243117543744365), np.float64(1.3467106723897286)] y_points =
[1.          +0.j
0.9998127998127999+0.01300781300781306j
0.9990847990847991+0.0228098228098228j
0.9984087984087984+0.03767663767663776j
0.997009997009997 +0.04498264498264493j
0.995023595023595 +0.06098826098826104j
0.9935311935311935+0.0701662701662702j
0.9909467909467911+0.08316628316628316j
0.9878267878267879+0.09551629551629559j
0.9845299845299846+0.1084331084331085j
0.9815919815919816+0.12096512096512102j
0.9768235768235769+0.12874952874952883j
0.9731783731783732+0.13932113932113932j
0.9684151684151685+0.15105235105235115j]
fit1: [ 0.388475401003345 -0.29910564223990704]
[ 0.388475401003345 -0.29910564223990704 0.388485400903345
-0.          ] 8.456105850187602e-11
[ 3.0521367837131830e-01 -3.2258559599604947e-01
3.0587928241831386e-01
-5.8060502317595575e-02 2.9410900049043689e-06]
1.5107929249155794e-10
E_gs: -0.32258559599604947
test mps sampling took: (0.0012578964233398438, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.06914250467479238
1 Execution time: 0:01:13.803049 ovlp:

```

```

(0.9999231999692799+0.00692280276912105j)
2 Execution time: 0:01:13.804983  ovlp:
(0.9996567998627199+0.01601880640752262j)
3 Execution time: 0:01:13.807752  ovlp:
(0.9993039997215998+0.0241260096504039j)
4 Execution time: 0:01:13.811040  ovlp:
(0.9986367994547198+0.031966812786725196j)
5 Execution time: 0:01:13.814998  ovlp:
(0.9978735991494396+0.039661215864486454j)
6 Execution time: 0:01:13.820403  ovlp:
(0.9970719988287995+0.04719961887984758j)
x_points = [np.float64(0.0), np.float64(0.06914250467479238),
np.float64(0.13828500934958476), np.float64(0.20742751402437715),
np.float64(0.27657001869916953), np.float64(0.3457125233739619),
np.float64(0.4148550280487543)] y_points = [1.          +0.j
0.9999231999692799+0.00692280276912105j
0.9996567998627199+0.01601880640752262j
0.9993039997215998+0.0241260096504039j
0.9986367994547198+0.0319668127867252j
0.9978735991494396+0.03966121586448645j
0.9970719988287995+0.04719961887984758j]
fit1: [ 0.28307269589126066 -0.42447887091937875]
[ 0.28307269589126066 -0.42447887091937875 0.28308269579126066
-0.          ] 4.165405120412058e-11
[ 2.4096757980094244e-01 -3.6134717441774772e-01
2.4098132027771418e-01
-1.3553856760690652e-01 1.4867851770435712e-06]
2.1182506658315597e-11
E_gs: -0.3613471744177477
test mps sampling took: (0.0013585090637207031, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.0539417234112964
1 Execution time: 0:01:14.339802  ovlp:
(0.9999271999271999+0.004817804817804916j)
2 Execution time: 0:01:14.341778  ovlp:
(0.9998231998231999+0.01157781157781157j)
3 Execution time: 0:01:14.344962  ovlp:
(0.9995579995579995+0.016330616330616277j)
4 Execution time: 0:01:14.348579  ovlp:
(0.9992511992511992+0.024312624312624376j)
5 Execution time: 0:01:14.353021  ovlp:
(0.9985283985283986+0.03478023478023484j)
6 Execution time: 0:01:14.357726  ovlp:
(0.9981955981955981+0.035118235118235086j)
7 Execution time: 0:01:14.363141  ovlp:

```

```

(0.9975611975611975+0.044051844051844036j)
8 Execution time: 0:01:14.370801 ovlp:
(0.9963755963755965+0.0487110487110487j)
9 Execution time: 0:01:14.378043 ovlp:
(0.9954707954707955+0.05466505466505467j)
10 Execution time: 0:01:14.385699 ovlp:
(0.9951639951639952+0.0651482651482651j)
11 Execution time: 0:01:14.393893 ovlp:
(0.9936195936195935+0.07157027157027152j)
12 Execution time: 0:01:14.402842 ovlp:
(0.9925743925743926+0.0773890773890773j)
13 Execution time: 0:01:14.412258 ovlp:
(0.991877591877592+0.08491348491348494j)
x_points = [np.float64(0.0), np.float64(0.0539417234112964),
np.float64(0.1078834468225928), np.float64(0.1618251702338892),
np.float64(0.2157668936451856), np.float64(0.26970861705648197),
np.float64(0.3236503404677784), np.float64(0.3775920638790748),
np.float64(0.4315337872903712), np.float64(0.48547551070166756),
np.float64(0.5394172341129639), np.float64(0.5933589575242604),
np.float64(0.6473006809355568), np.float64(0.7012424043468531)]
y_points = [1.          +0.j
0.9999271999271999+0.00481780481780492j
0.9998231998231999+0.01157781157781157j
0.9995579995579995+0.01633061633061628j
0.9992511992511992+0.02431262431262438j
0.9985283985283986+0.03478023478023484j
0.9981955981955981+0.03511823511823509j
0.9975611975611975+0.04405184405184404j
0.9963755963755965+0.0487110487110487j
0.9954707954707955+0.05466505466505467j
0.9951639951639952+0.0651482651482651j
0.9936195936195935+0.07157027157027152j
0.9925743925743926+0.0773890773890773j
0.991877591877592 +0.08491348491348494j]
fit1: [ 0.47414560781763027 -0.25002461297519146]
[ 0.47414560781763027 -0.25002461297519146  0.47415560771763027
-0.          ] 2.099331407959612e-10
[ 4.0328960452945967e-01 -2.2760048747007705e-01
3.9610493625784998e-01
-6.9736900540748131e-02  1.7787548843774657e-06]
3.8304007716153655e-10
E_gs: -0.22760048747007705
test mps sampling took: (0.0013256072998046875, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.18654386704167014

```

1 Execution time: 0:01:15.049427 ovlp:
(0.9995123993173591+0.018892226449116922j)
2 Execution time: 0:01:15.051401 ovlp:
(0.9976907967671156+0.045673463942849546j)
3 Execution time: 0:01:15.054602 ovlp:
(0.99485719280007+0.06463469048856663j)
4 Execution time: 0:01:15.058049 ovlp:
(0.9903123864373411+0.0852427193398071j)
5 Execution time: 0:01:15.062677 ovlp:
(0.9844887782842895+0.10735035029049045j)
6 Execution time: 0:01:15.068008 ovlp:
(0.9781775694485972+0.12644957702940784j)
7 Execution time: 0:01:15.073581 ovlp:
(0.9709739593635431+0.15197961277145788j)
8 Execution time: 0:01:15.080675 ovlp:
(0.9619119466767254+0.16472163061028278j)
9 Execution time: 0:01:15.087748 ovlp:
(0.9512307317230244+0.18779526291336812j)
10 Execution time: 0:01:15.095494 ovlp:
(0.9396755155457217+0.2078328909660474j)
11 Execution time: 0:01:15.103792 ovlp:
(0.9296935015709022+0.22052890874047226j)
12 Execution time: 0:01:15.112821 ovlp:
(0.9155622817871945+0.23883693437170805j)
13 Execution time: 0:01:15.122427 ovlp:
(0.9013114618360465+0.25502895704053996j)
14 Execution time: 0:01:15.132756 ovlp:
(0.8884866438813015+0.270898979258571j)
15 Execution time: 0:01:15.143677 ovlp:
(0.870887019241827+0.2847173986043581j)
16 Execution time: 0:01:15.155506 ovlp:
(0.853600195040273+0.2962634147687806j)
17 Execution time: 0:01:15.169958 ovlp:
(0.8400485760680065+0.3101094341532078j)
18 Execution time: 0:01:15.183480 ovlp:
(0.8223109512353317+0.3196866475613065j)
19 Execution time: 0:01:15.197443 ovlp:
(0.8044353262094568+0.3308186631461285j)
20 Execution time: 0:01:15.212145 ovlp:
(0.7885101039141456+0.34953148934408507j)
21 Execution time: 0:01:15.229644 ovlp:
(0.7674972744961843+0.35100349140488807j)
22 Execution time: 0:01:15.245642 ovlp:
(0.7486188480663873+0.358142701399782j)
23 Execution time: 0:01:15.262039 ovlp:
(0.7320772249081149+0.36338670874139223j)
x_points = [np.float64(0.0), np.float64(0.18654386704167014),

```
np.float64(0.3730877340833403), np.float64(0.5596316011250104),
np.float64(0.7461754681666806), np.float64(0.9327193352083507),
np.float64(1.1192632022500208), np.float64(1.305807069291691),
np.float64(1.4923509363333611), np.float64(1.6788948033750313),
np.float64(1.8654386704167014), np.float64(2.051982537458372),
np.float64(2.2385264045000417), np.float64(2.4250702715417116),
np.float64(2.611614138583382), np.float64(2.7981580056250523),
np.float64(2.9847018726667223), np.float64(3.171245739708392),
np.float64(3.3577896067500625), np.float64(3.544333473791733),
np.float64(3.730877340833403), np.float64(3.9174212078750728),
np.float64(4.103965074916744), np.float64(4.2905089419584135)] y_points
```

```
= [1.          +0.j
0.9995123993173591+0.01889222644911692j
0.9976907967671156+0.04567346394284955j
0.99485719280007  +0.06463469048856663j
0.9903123864373411+0.0852427193398071j
0.9844887782842895+0.10735035029049045j
0.9781775694485972+0.12644957702940784j
0.9709739593635431+0.15197961277145788j
0.9619119466767254+0.16472163061028278j
0.9512307317230244+0.18779526291336812j
0.9396755155457217+0.2078328909660474j
0.9296935015709022+0.22052890874047226j
0.9155622817871945+0.23883693437170805j
0.9013114618360465+0.25502895704053996j
0.8884866438813015+0.270898979258571j
0.870887019241827  +0.2847173986043581j
0.853600195040273  +0.2962634147687806j
0.8400485760680065+0.3101094341532078j
0.8223109512353317+0.3196866475613065j
0.8044353262094568+0.3308186631461285j
0.7885101039141456+0.34953148934408507j
0.7674972744961843+0.35100349140488807j
0.7486188480663873+0.358142701399782j
0.7320772249081149+0.36338670874139223j]
fit1: [ 0.3840276340700732 -0.2977453657385313]
[ 0.3384913900871177 -0.318603733362153  0.383995243379457
-0.02084531831255889] 1.8293795207694017e-09
[ 0.27507888730772967 -0.35062018330576616  0.2815357118508243
-0.06730661265364932 -0.00456366691363676]
1.9657734331823802e-09
E_gs: -0.35062018330576616
test mps sampling took: (0.0012552738189697266, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.19429981371545776
```

```

1 Execution time: 0:01:15.671054  ovlp:
(0.999344+0.024143999999999994j)
2 Execution time: 0:01:15.673590  ovlp: (0.997528+0.042983999999999991j)
3 Execution time: 0:01:15.677096  ovlp:
(0.99389599999999999+0.066648000000000004j)
4 Execution time: 0:01:15.681431  ovlp:
(0.98943200000000001+0.08713600000000001j)
5 Execution time: 0:01:15.686557  ovlp: (0.98322400000000001+0.112792j)
6 Execution time: 0:01:15.691802  ovlp:
(0.97566400000000001+0.133944000000000006j)
7 Execution time: 0:01:15.698110  ovlp: (0.9676+0.149248000000000005j)
8 Execution time: 0:01:15.704995  ovlp: (0.957864+0.172368000000000008j)
9 Execution time: 0:01:15.711707  ovlp:
(0.94817599999999999+0.188536000000000004j)
10 Execution time: 0:01:15.720107  ovlp:
(0.93639999999999999+0.213975999999999994j)
11 Execution time: 0:01:15.729512  ovlp:
(0.922016+0.227943999999999992j)
12 Execution time: 0:01:15.738774  ovlp: (0.90944+0.248143999999999992j)
13 Execution time: 0:01:15.749293  ovlp: (0.895232+0.26502399999999999j)
14 Execution time: 0:01:15.760715  ovlp: (0.87816+0.279352000000000004j)
15 Execution time: 0:01:15.774572  ovlp:
(0.86264000000000001+0.293576000000000006j)
16 Execution time: 0:01:15.788719  ovlp:
(0.84603999999999999+0.307792000000000007j)
17 Execution time: 0:01:15.801705  ovlp:
(0.82739999999999999+0.31781600000000001j)
18 Execution time: 0:01:15.814957  ovlp: (0.807536+0.33094399999999999j)
19 Execution time: 0:01:15.828597  ovlp:
(0.79025600000000001+0.340543999999999996j)
20 Execution time: 0:01:15.845604  ovlp:
(0.771552+0.34850399999999999j)
x_points = [np.float64(0.0), np.float64(0.19429981371545776),
np.float64(0.38859962743091553), np.float64(0.5828994411463733),
np.float64(0.7771992548618311), np.float64(0.9714990685772888),
np.float64(1.1657988822927465), np.float64(1.3600986960082044),
np.float64(1.5543985097236621), np.float64(1.7486983234391198),
np.float64(1.9429981371545777), np.float64(2.1372979508700354),
np.float64(2.331597764585493), np.float64(2.5258975783009507),
np.float64(2.720197392016409), np.float64(2.9144972057318665),
np.float64(3.1087970194473242), np.float64(3.303096833162782),
np.float64(3.4973966468782396), np.float64(3.6916964605936977),
np.float64(3.8859962743091554)] y_points = [1.          +0.j
0.999344          +0.024143999999999994j
0.997528          +0.042983999999999991j
0.99389599999999999+0.066648000000000004j
0.98943200000000001+0.08713600000000001j

```

0.9832240000000001+0.112792j
 0.9756640000000001+0.13394400000000006j
 0.9676 +0.14924800000000005j
 0.957864 +0.17236800000000008j
 0.9481759999999999+0.18853600000000004j
 0.9363999999999999+0.21397599999999994j
 0.922016 +0.22794399999999992j
 0.90944 +0.24814399999999992j
 0.895232 +0.2650239999999999j
 0.87816 +0.27935200000000004j
 0.8626400000000001+0.29357600000000006j
 0.8460399999999999+0.30779200000000007j
 0.8273999999999999+0.31781600000000001j
 0.807536 +0.3309439999999999j
 0.7902560000000001+0.34054399999999996j
 0.771552 +0.3485039999999999j]
 fit1: [0.3813966140573678 -0.3003877657273347]
 [0.38128058510857366 -0.300052578079852 0.3814066139573678
 -0.00052367777304494] 4.464067671554757e-10
 [2.7246562454638645e-01 -3.5206221409573618e-01
 3.0867233982250242e-01
 -6.6728914722538474e-02 -5.7809507004418627e-05]
 6.457878163619766e-10
 E_gs: -0.3520622140957362
 test mps sampling took: (0.0012712478637695312, Counter({0: 6, 2: 4}))
 truncated ham size: 12 Number of fitting points: 19
 shots per matrix element: 277777.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.19836914296808145
 1 Execution time: 0:01:16.241737 ovlp:
 (0.999251197903354+0.022143662002253706j)
 2 Execution time: 0:01:16.243651 ovlp:
 (0.9972783923794986+0.04567332788531808j)
 3 Execution time: 0:01:16.246213 ovlp:
 (0.9937143824002708+0.07047739733671254j)
 4 Execution time: 0:01:16.249572 ovlp:
 (0.9888903688930328+0.08898144914805761j)
 5 Execution time: 0:01:16.253524 ovlp:
 (0.9822447502853009+0.11475752132105965j)
 6 Execution time: 0:01:16.258130 ovlp:
 (0.9751527304276453+0.1385679879903663j)
 7 Execution time: 0:01:16.263577 ovlp:
 (0.9671463080096625+0.15468163310857275j)
 8 Execution time: 0:01:16.269512 ovlp:
 (0.9570950798662237+0.17594329264121944j)
 9 Execution time: 0:01:16.276121 ovlp:
 (0.9454814473480526+0.19640574993609983j)

```

10 Execution time: 0:01:16.283469  ovlp:
(0.9327158116042724+0.21426179993303984j)
11 Execution time: 0:01:16.291563  ovlp:
(0.9180493705382375+0.23411945553447544j)
12 Execution time: 0:01:16.300407  ovlp:
(0.9061909373346246+0.2515003042008517j)
13 Execution time: 0:01:16.311732  ovlp:
(0.8911068950993062+0.2689315530083485j)
14 Execution time: 0:01:16.322619  ovlp:
(0.8749932499811+0.2848867976830336j)
15 Execution time: 0:01:16.334035  ovlp:
(0.8557187960126289+0.30096444270043965j)
16 Execution time: 0:01:16.345673  ovlp:
(0.8409011545232328+0.3128012758435723j)
17 Execution time: 0:01:16.358066  ovlp:
(0.8205538975509132+0.3233421053578951j)
18 Execution time: 0:01:16.373179  ovlp:
(0.8040442513239037+0.3354381392267898j)
x_points = [np.float64(0.0), np.float64(0.19836914296808145),
np.float64(0.3967382859361629), np.float64(0.5951074289042444),
np.float64(0.7934765718723258), np.float64(0.9918457148404072),
np.float64(1.1902148578084888), np.float64(1.3885840007765702),
np.float64(1.5869531437446516), np.float64(1.785322286712733),
np.float64(1.9836914296808144), np.float64(2.1820605726488957),
np.float64(2.3804297156169776), np.float64(2.578798858585059),
np.float64(2.7771680015531404), np.float64(2.9755371445212218),
np.float64(3.173906287489303), np.float64(3.3722754304573845),
np.float64(3.570644573425466)] y_points = [1.          +0.j
0.999251197903354 +0.02214366200225371j
0.9972783923794986+0.04567332788531808j
0.9937143824002708+0.07047739733671254j
0.9888903688930328+0.08898144914805761j
0.9822447502853009+0.11475752132105965j
0.9751527304276453+0.1385679879903663j
0.9671463080096625+0.15468163310857275j
0.9570950798662237+0.17594329264121944j
0.9454814473480526+0.19640574993609983j
0.9327158116042724+0.21426179993303984j
0.9180493705382375+0.23411945553447544j
0.9061909373346246+0.2515003042008517j
0.8911068950993062+0.2689315530083485j
0.8749932499811  +0.2848867976830336j
0.8557187960126289+0.30096444270043965j
0.8409011545232328+0.3128012758435723j
0.8205538975509132+0.3233421053578951j
0.8040442513239037+0.3354381392267898j ]
fit1: [ 0.3842905451212846 -0.29949117467603753]

```



```

[ 0.3842626952128768 -0.29921186844465403 0.3843005450212846
 -0.00044657662705028] 4.2099874233980776e-10
[ 2.926449235913512e-01 -3.416726621952580e-01
 2.943952867078774e-01
 -5.701089649977951e-02 -6.987485677753050e-05]
1.7300933617348543e-10
E_gs: -0.341672662195258
test mps sampling took: (0.0012481212615966797, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.06966671763015939
1 Execution time: 0:01:16.810328 ovlp:
(0.9999135998617599+0.00789121262594028j)
2 Execution time: 0:01:16.812190 ovlp:
(0.999654399447039+0.014011222417955826j)
3 Execution time: 0:01:16.814771 ovlp:
(0.9992415987865582+0.021763234821175814j)
4 Execution time: 0:01:16.818125 ovlp:
(0.9986127977804764+0.03331685330696521j)
5 Execution time: 0:01:16.822012 ovlp:
(0.9978879966207945+0.039532863252581096j)
6 Execution time: 0:01:16.826626 ovlp:
(0.996899195038712+0.04740967585548139j)
7 Execution time: 0:01:16.831910 ovlp:
(0.9960591936947099+0.055790489264782916j)
8 Execution time: 0:01:16.837887 ovlp:
(0.9946335914137463+0.06575530520848827j)
9 Execution time: 0:01:16.844617 ovlp:
(0.9930399888639823+0.07437611900179042j)
10 Execution time: 0:01:16.852020 ovlp:
(0.9912879860607777+0.0818305309288494j)
11 Execution time: 0:01:16.859971 ovlp:
(0.9896463834342135+0.08614573783318047j)
12 Execution time: 0:01:16.868642 ovlp:
(0.9878367805388488+0.09371534994455999j)
x_points = [np.float64(0.0), np.float64(0.06966671763015939),
np.float64(0.13933343526031877), np.float64(0.20900015289047816),
np.float64(0.27866687052063754), np.float64(0.34833358815079696),
np.float64(0.4180003057809563), np.float64(0.4876670234111157),
np.float64(0.5573337410412751), np.float64(0.6270004586714345),
np.float64(0.6966671763015939), np.float64(0.7663338939317532),
np.float64(0.8360006115619126)] y_points = [1.          +0.j
0.9999135998617599+0.00789121262594028j
0.999654399447039 +0.01401122241795583j
0.9992415987865582+0.02176323482117581j
0.9986127977804764+0.03331685330696521j

```

0.9978879966207945+0.0395328632525811j
 0.996899195038712 +0.04740967585548139j
 0.9960591936947099+0.05579048926478292j
 0.9946335914137463+0.06575530520848827j
 0.9930399888639823+0.07437611900179042j
 0.9912879860607777+0.0818305309288494j
 0.9896463834342135+0.08614573783318047j
 0.9878367805388488+0.09371534994455999j
 fit1: [0.3427950520487657 -0.3373870337358701]
 [0.3427950520487657 -0.3373870337358701 0.3428050519487657
 -0.] 7.923723804696194e-11
 [2.7716044377829852e-01 -3.0241986530569437e-01
 2.8598038217267219e-01
 -1.1227368511875194e-01 2.4252769353237921e-06]
 1.4781383777107845e-10
 E_gs: -0.30241986530569437
 test mps sampling took: (0.001276254653930664, Counter({0: 6, 2: 4}))
 truncated ham size: 12 Number of fitting points: 16
 shots per matrix element: 333333.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.16260820509062932
 1 Execution time: 0:01:17.393438 ovlp:
 (0.9995619995619995+0.021141021141021232j)
 2 Execution time: 0:01:17.395395 ovlp:
 (0.9980019980019981+0.041427041427041456j)
 3 Execution time: 0:01:17.397978 ovlp:
 (0.9957159957159958+0.05658305658305651j)
 4 Execution time: 0:01:17.401331 ovlp:
 (0.9927219927219928+0.07757707757707766j)
 5 Execution time: 0:01:17.405338 ovlp:
 (0.9883419883419884+0.09563109563109573j)
 6 Execution time: 0:01:17.410000 ovlp:
 (0.983049983049983+0.11264111264111265j)
 7 Execution time: 0:01:17.416357 ovlp:
 (0.9772299772299773+0.13175113175113173j)
 8 Execution time: 0:01:17.423260 ovlp:
 (0.9702639702639702+0.14612114612114602j)
 9 Execution time: 0:01:17.430705 ovlp:
 (0.9622359622359622+0.16562716562716573j)
 10 Execution time: 0:01:17.438392 ovlp:
 (0.9542439542439543+0.17984117984117987j)
 11 Execution time: 0:01:17.446580 ovlp:
 (0.9457059457059458+0.19749919749919753j)
 12 Execution time: 0:01:17.455329 ovlp:
 (0.9354219354219355+0.21261921261921257j)
 13 Execution time: 0:01:17.465026 ovlp:
 (0.9238959238959239+0.22998322998323006j)

```

14 Execution time: 0:01:17.476793  ovlp:
(0.9118119118119119+0.24021924021924024j)
15 Execution time: 0:01:17.488880  ovlp:
(0.8999018999019+0.2550152550152549j)
x_points = [np.float64(0.0), np.float64(0.16260820509062932),
np.float64(0.32521641018125863), np.float64(0.4878246152718879),
np.float64(0.6504328203625173), np.float64(0.8130410254531466),
np.float64(0.9756492305437758), np.float64(1.1382574356344053),
np.float64(1.3008656407250345), np.float64(1.4634738458156638),
np.float64(1.6260820509062932), np.float64(1.7886902559969224),
np.float64(1.9512984610875517), np.float64(2.113906666178181),
np.float64(2.2765148712688106), np.float64(2.4391230763594396)] y_points
= [1.          +0.j
0.9995619995619995+0.02114102114102123j
0.9980019980019981+0.04142704142704146j
0.9957159957159958+0.05658305658305651j
0.9927219927219928+0.07757707757707766j
0.9883419883419884+0.09563109563109573j
0.983049983049983 +0.11264111264111265j
0.9772299772299773+0.13175113175113173j
0.9702639702639702+0.14612114612114602j
0.9622359622359622+0.16562716562716573j
0.9542439542439543+0.17984117984117987j
0.9457059457059458+0.19749919749919753j
0.9354219354219355+0.21261921261921257j
0.9238959238959239+0.22998322998323006j
0.9118119118119119+0.24021924021924024j
0.8999018999019 +0.2550152550152549j ]
fit1: [ 0.3790134629929775 -0.30606497658046894]
[ 0.3790134629929775 -0.30606497658046894 0.3790234628929775
-0.          ] 2.367643625465662e-10
[ 2.9698364941719663e-01 -3.4341872640040777e-01
2.9684887838853136e-01
-4.9744499611161959e-02 2.4597245788163385e-06]
1.4713701600225063e-10
E_gs: -0.34341872640040777
test mps sampling took: (0.0013225078582763672, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2724440414303451
1 Execution time: 0:01:18.038008  ovlp:
(0.9985463979649571+0.030971843360580786j)
2 Execution time: 0:01:18.039970  ovlp:
(0.9947467926455098+0.06333748867248423j)
3 Execution time: 0:01:18.042599  ovlp:
(0.9881043833461367+0.09571233399726764j)

```

4 Execution time: 0:01:18.046402 ovlp:
(0.9787387702342782+0.12874038023653234j)
5 Execution time: 0:01:18.050791 ovlp:
(0.968250755510578+0.15515361721506404j)
6 Execution time: 0:01:18.056617 ovlp:
(0.9533835347369486+0.18366445713023993j)
7 Execution time: 0:01:18.062931 ovlp:
(0.9376423126992377+0.20471408659972123j)
8 Execution time: 0:01:18.070039 ovlp:
(0.9215514901720863+0.2349269288977005j)
9 Execution time: 0:01:18.077221 ovlp:
(0.9009158612822057+0.2577613608659053j)
10 Execution time: 0:01:18.084748 ovlp:
(0.8792682309755233+0.27968499155898807j)
11 Execution time: 0:01:18.092824 ovlp:
(0.8547041965858753+0.29664981530974144j)
12 Execution time: 0:01:18.101529 ovlp:
(0.8308301631622284+0.3205422487591483j)
13 Execution time: 0:01:18.111154 ovlp:
(0.8063305288627405+0.33037706252788746j)
14 Execution time: 0:01:18.121462 ovlp:
(0.7796964915750881+0.3487586882621636j)
15 Execution time: 0:01:18.132144 ovlp:
(0.7527220538108754+0.35945830324162453j)
16 Execution time: 0:01:18.143718 ovlp:
(0.7215064101089741+0.3632027084837919j)
17 Execution time: 0:01:18.158070 ovlp:
(0.6936487711082795+0.371979520771329j)
18 Execution time: 0:01:18.171430 ovlp:
(0.6687627362678308+0.37262352167293034j)
19 Execution time: 0:01:18.187286 ovlp:
(0.640279496391295+0.37846552985174187j)
20 Execution time: 0:01:18.201715 ovlp:
(0.6160834625168474+0.3773247282546195j)
21 Execution time: 0:01:18.217009 ovlp:
(0.5873058222281511+0.3685295159413222j)
22 Execution time: 0:01:18.233891 ovlp:
(0.5630085882120235+0.3687687162762028j)
23 Execution time: 0:01:18.252398 ovlp:
(0.5406801569522197+0.3562474987464983j)
x_points = [np.float64(0.0), np.float64(0.2724440414303451),
np.float64(0.5448880828606902), np.float64(0.8173321242910354),
np.float64(1.0897761657213805), np.float64(1.3622202071517255),
np.float64(1.6346642485820708), np.float64(1.9071082900124159),
np.float64(2.179552331442761), np.float64(2.451996372873106),
np.float64(2.724440414303451), np.float64(2.996884455733796),
np.float64(3.2693284971641416), np.float64(3.5417725385944867),

```

np.float64(3.8142165800248318), np.float64(4.086660621455176),
np.float64(4.359104662885522), np.float64(4.631548704315867),
np.float64(4.903992745746212), np.float64(5.1764367871765575),
np.float64(5.448880828606902), np.float64(5.721324870037248),
np.float64(5.993768911467592), np.float64(6.266212952897938)] y_points =
[1.          +0.j
 0.9985463979649571+0.03097184336058079j
 0.9947467926455098+0.06333748867248423j
 0.9881043833461367+0.09571233399726764j
 0.9787387702342782+0.12874038023653234j
 0.9682507555510578+0.15515361721506404j
 0.9533835347369486+0.18366445713023993j
 0.9376423126992377+0.20471408659972123j
 0.9215514901720863+0.2349269288977005j
 0.9009158612822057+0.2577613608659053j
 0.8792682309755233+0.27968499155898807j
 0.8547041965858753+0.29664981530974144j
 0.8308301631622284+0.3205422487591483j
 0.8063305288627405+0.33037706252788746j
 0.7796964915750881+0.3487586882621636j
 0.7527220538108754+0.35945830324162453j
 0.7215064101089741+0.3632027084837919j
 0.6936487711082795+0.371979520771329j
 0.6687627362678308+0.37262352167293034j
 0.640279496391295 +0.37846552985174187j
 0.6160834625168474+0.3773247282546195j
 0.5873058222281511+0.3685295159413222j
 0.5630085882120235+0.3687687162762028j
 0.5406801569522197+0.3562474987464983j ]
fit1: [ 0.3764115978003559 -0.2940572508116111]
[ 0.29584331281567894 -0.3376116639139456  0.35904648440958514
 -0.04620116399305748] 2.277099789903472e-09
[ 0.29197013958694046 -0.34053010567910885  0.28415743627397205
 -0.05155952900909241 -0.00666868812797298] 2.3091879439857577e-09
E_gs: -0.34053010567910885
test mps sampling took: (0.0013103485107421875, Counter({2: 8, 0: 2}))
truncated ham size: 12 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.0050968699124251185
1 Execution time: 0:01:18.626025 ovlp:
(0.9999967999999999+0.0017759999999999998j)
2 Execution time: 0:01:18.628428 ovlp: (1-0.00057280000000000399j)
3 Execution time: 0:01:18.631155 ovlp:
(0.9999936+0.00132479999999999038j)
4 Execution time: 0:01:18.634679 ovlp:
(0.9999904+0.0028543999999999237j)

```

```

5 Execution time: 0:01:18.639346 ovlp:
(0.9999904+0.00329920000000000576j)
6 Execution time: 0:01:18.644515 ovlp:
(0.9999712000000001+0.0035103999999999136j)
7 Execution time: 0:01:18.649865 ovlp:
(0.999984+0.00441920000000000675j)
8 Execution time: 0:01:18.656102 ovlp:
(0.999968+0.0056160000000000065j)
x_points = [np.float64(0.0), np.float64(0.0050968699124251185),
np.float64(0.010193739824850237), np.float64(0.015290609737275355),
np.float64(0.020387479649700474), np.float64(0.025484349562125592),
np.float64(0.03058121947455071), np.float64(0.03567808938697583),
np.float64(0.04077495929940095)] y_points = [1.          +0.j
0.9999967999999999+0.001776j
1.          -0.000572800000000004j
0.9999936      +0.00132479999999999j
0.9999904      +0.002854399999999992j
0.9999904      +0.003299200000000006j
0.9999712000000001+0.00351039999999991j
0.999984      +0.004419200000000007j
0.999968      +0.005616000000000007j]
fit1: [ 0.18192541112226596 -1.1825230534564277 ]
[ 0.18192541112226596 -1.1825230534564277  0.18193541102226596
-0.          ] 2.0125115219667338e-10
[ 1.6108319512792729e-01 -1.0470484777653752e+00
1.6109179427576240e-01
-4.5434243162254861e-01  1.1456961178178345e-06]
5.348919275950097e-10
E_gs: -1.0470484777653752
test mps sampling took: (0.0012845993041992188, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.18119617422837658
1 Execution time: 0:01:18.815104 ovlp:
(0.9993395993395993+0.021104221104221166j)
2 Execution time: 0:01:18.817133 ovlp:
(0.9974623974623975+0.04363064363064373j)
3 Execution time: 0:01:18.819789 ovlp:
(0.9946387946387947+0.0641082641082642j)
4 Execution time: 0:01:18.823115 ovlp:
(0.991097591097591+0.08422708422708425j)
5 Execution time: 0:01:18.827144 ovlp:
(0.9856115856115857+0.10322790322790332j)
6 Execution time: 0:01:18.831746 ovlp:
(0.9795847795847796+0.12478712478712484j)
7 Execution time: 0:01:18.837088 ovlp:

```

```

(0.9723151723151724+0.1437723437723437j)
8 Execution time: 0:01:18.843102  ovlp:
(0.9636831636831638+0.16427076427076437j)
9 Execution time: 0:01:18.850995  ovlp:
(0.9537823537823538+0.18126958126958126j)
10 Execution time: 0:01:18.859742  ovlp:
(0.9441155441155442+0.19962559962559956j)
11 Execution time: 0:01:18.868009  ovlp:
(0.9324935324935324+0.22033202033202026j)
12 Execution time: 0:01:18.877290  ovlp:
(0.92011232011232+0.23439283439283431j)
13 Execution time: 0:01:18.886724  ovlp:
(0.906061906061906+0.24821444821444816j)
x_points = [np.float64(0.0), np.float64(0.18119617422837658),
np.float64(0.36239234845675317), np.float64(0.5435885226851298),
np.float64(0.7247846969135063), np.float64(0.9059808711418829),
np.float64(1.0871770453702596), np.float64(1.2683732195986361),
np.float64(1.4495693938270127), np.float64(1.6307655680553892),
np.float64(1.8119617422837657), np.float64(1.9931579165121425),
np.float64(2.174354090740519), np.float64(2.3555502649688957)] y_points
= [1.          +0.j
0.9993395993395993+0.02110422110422117j
0.9974623974623975+0.04363064363064373j
0.9946387946387947+0.0641082641082642j
0.991097591097591 +0.08422708422708425j
0.9856115856115857+0.10322790322790332j
0.9795847795847796+0.12478712478712484j
0.9723151723151724+0.1437723437723437j
0.9636831636831638+0.16427076427076437j
0.9537823537823538+0.18126958126958126j
0.9441155441155442+0.19962559962559956j
0.9324935324935324+0.22033202033202026j
0.92011232011232 +0.23439283439283431j
0.906061906061906 +0.24821444821444816j]
fit1: [ 0.38131937156240164 -0.30486368004095643]
[ 0.38131937156240164 -0.30486368004095643  0.38132937146240165
-0.          ] 6.091893052405185e-11
[ 2.8576348228214044e-01 -3.4510240617560922e-01
2.8841189737204348e-01
-6.3453929583878382e-02  5.4965982433065028e-06]
5.072112224334722e-11
E_gs: -0.3451024061756092
test mps sampling took: (0.0012552738189697266, Counter({0: 8, 2: 2}))
truncated ham size: 12 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.19141068607097655

```

```
1 Execution time: 0:01:19.410440  ovlp:
(0.9994707994707994+0.022062622062622106j)
2 Execution time: 0:01:19.412413  ovlp:
(0.9974295974295975+0.043692643692643696j)
3 Execution time: 0:01:19.414992  ovlp:
(0.9940443940443942+0.06759066759066767j)
4 Execution time: 0:01:19.418347  ovlp:
(0.9897687897687897+0.08513828513828514j)
5 Execution time: 0:01:19.422287  ovlp:
(0.9841155841155842+0.10999390999391001j)
6 Execution time: 0:01:19.426860  ovlp:
(0.977025977025977+0.13337953337953334j)
7 Execution time: 0:01:19.432286  ovlp:
(0.9689535689535689+0.15317835317835327j)
8 Execution time: 0:01:19.438325  ovlp:
(0.9597975597975599+0.17216237216237218j)
9 Execution time: 0:01:19.444916  ovlp:
(0.949087549087549+0.19081039081039086j)
10 Execution time: 0:01:19.452110  ovlp:
(0.9373275373275374+0.21208761208761207j)
11 Execution time: 0:01:19.460120  ovlp:
(0.924912324912325+0.22696402696402695j)
12 Execution time: 0:01:19.468655  ovlp:
(0.9124551124551123+0.24998004998004997j)
13 Execution time: 0:01:19.479856  ovlp:
(0.8978558978558979+0.2615384615384615j)
14 Execution time: 0:01:19.490748  ovlp:
(0.8816942816942817+0.2790020790020791j)
15 Execution time: 0:01:19.505164  ovlp:
(0.8654066654066654+0.2937692937692937j)
16 Execution time: 0:01:19.517111  ovlp:
(0.8505302505302506+0.30556290556290566j)
17 Execution time: 0:01:19.529588  ovlp:
(0.8306810306810306+0.3192297192297193j)
18 Execution time: 0:01:19.542728  ovlp:
(0.8143514143514143+0.3288057288057289j)
19 Execution time: 0:01:19.556530  ovlp:
(0.795022995022995+0.3418425418425419j)
20 Execution time: 0:01:19.570747  ovlp:
(0.7767613767613768+0.343908943908944j)
21 Execution time: 0:01:19.585680  ovlp:
(0.7574665574665576+0.35994455994455987j)
x_points = [np.float64(0.0), np.float64(0.19141068607097655),
np.float64(0.3828213721419531), np.float64(0.5742320582129297),
np.float64(0.7656427442839062), np.float64(0.9570534303548828),
np.float64(1.1484641164258593), np.float64(1.3398748024968359),
np.float64(1.5312854885678124), np.float64(1.722696174638789),
```



```

np.float64(1.9141068607097655), np.float64(2.1055175467807423),
np.float64(2.2969282328517187), np.float64(2.488338918922695),
np.float64(2.6797496049936718), np.float64(2.8711602910646485),
np.float64(3.062570977135625), np.float64(3.253981663206601),
np.float64(3.445392349277578), np.float64(3.6368030353485548),
np.float64(3.828213721419531), np.float64(4.019624407490507)] y_points =
[1.          +0.j
 0.9994707994707994+0.02206262206262211j
 0.9974295974295975+0.0436926436926437j
 0.9940443940443942+0.06759066759066767j
 0.9897687897687897+0.08513828513828514j
 0.9841155841155842+0.10999390999391001j
 0.977025977025977 +0.13337953337953334j
 0.9689535689535689+0.15317835317835327j
 0.9597975597975599+0.17216237216237218j
 0.949087549087549 +0.19081039081039086j
 0.9373275373275374+0.21208761208761207j
 0.924912324912325 +0.22696402696402695j
 0.9124551124551123+0.24998004998004997j
 0.8978558978558979+0.2615384615384615j
 0.8816942816942817+0.2790020790020791j
 0.8654066654066654+0.2937692937692937j
 0.8505302505302506+0.30556290556290566j
 0.8306810306810306+0.3192297192297193j
 0.8143514143514143+0.3288057288057289j
 0.795022995022995 +0.3418425418425419j
 0.7767613767613768+0.343908943908944j
 0.7574665574665576+0.35994455994455987j]
fit1: [ 0.38407982607903807 -0.29931478492014135]
[ 0.33197242203262806 -0.3227064824630096  0.38408672520587567
 -0.02403275510468473] 7.497968327757589e-10
[ 0.28029061364912994 -0.3486564986618329  0.2885898470944156
 -0.06231782771071219 -0.00458714117589534] 5.911641023693992e-10
E_gs: -0.3486564986618329
test mps sampling took: (0.0012514591217041016, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.04636458655352288
1 Execution time: 0:01:20.032747  ovlp:
(0.9999579999579999+0.0053746053746053235j)
2 Execution time: 0:01:20.034722  ovlp:
(0.9998543998543998+0.01109781109781105j)
3 Execution time: 0:01:20.037321  ovlp:
(0.9996107996107997+0.016037016037016016j)
4 Execution time: 0:01:20.040623  ovlp:
(0.9994483994483994+0.02209062209062207j)

```

```

5 Execution time: 0:01:20.044511 ovlp:
(0.998997598997599+0.029549829549829543j)
6 Execution time: 0:01:20.049110 ovlp:
(0.9985019985019985+0.031465031465031545j)
7 Execution time: 0:01:20.054451 ovlp:
(0.9982527982527982+0.036351036351036425j)
x_points = [np.float64(0.0), np.float64(0.04636458655352288),
np.float64(0.09272917310704576), np.float64(0.13909375966056864),
np.float64(0.18545834621409152), np.float64(0.2318229327676144),
np.float64(0.2781875193211373), np.float64(0.32455210587466016)] y_points
= [1.          +0.j
0.9999579999579999+0.00537460537460532j
0.9998543998543998+0.01109781109781105j
0.9996107996107997+0.01603701603701602j
0.9994483994483994+0.02209062209062207j
0.998997598997599 +0.02954982954982954j
0.9985019985019985+0.03146503146503155j
0.9982527982527982+0.03635103635103643j]
fit1: [ 0.4910488803578702 -0.24553915369891482]
[ 0.4910488803578702 -0.24553915369891482 0.4910588802578702
-0.          ] 4.144780527391431e-11
[ 4.2685616803665066e-01 -2.1344978986068111e-01
4.2685999520169637e-01
-7.6086175888895005e-02 1.3073112330924690e-06]
1.430845982584826e-10
E_gs: -0.2134497898606811
test mps sampling took: (0.0012125968933105469, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2968649242675615
1 Execution time: 0:01:20.359415 ovlp:
(0.9985527959478286+0.03591730056844167j)
2 Execution time: 0:01:20.361678 ovlp:
(0.9937647825413911+0.06954139471590515j)
3 Execution time: 0:01:20.364506 ovlp:
(0.9858879604862893+0.10394309104065491j)
4 Execution time: 0:01:20.368021 ovlp:
(0.9751455304074852+0.13594718065210576j)
5 Execution time: 0:01:20.372157 ovlp:
(0.962099093877463+0.1665616663726659j)
6 Execution time: 0:01:20.376886 ovlp:
(0.9460142488398968+0.19649935019818066j)
7 Execution time: 0:01:20.382335 ovlp:
(0.9267181948109455+0.22218902212926195j)
8 Execution time: 0:01:20.388475 ovlp:
(0.9065437383224673+0.2518675052290147j)

```

```

9 Execution time: 0:01:20.395226 ovlp:
(0.8811780672985885+0.27976758334923346j)
10 Execution time: 0:01:20.402656 ovlp:
(0.856136397181912+0.2960756290117612j)
11 Execution time: 0:01:20.410557 ovlp:
(0.8306699258757924+0.3146804811053472j)
12 Execution time: 0:01:20.419263 ovlp:
(0.8023018464451701+0.3353949391058295j)
13 Execution time: 0:01:20.428726 ovlp:
(0.7722345622567743+0.3458925684991918j)
14 Execution time: 0:01:20.438751 ovlp:
(0.7435136818383092+0.3581254027511278j)
15 Execution time: 0:01:20.449626 ovlp:
(0.7147856013996838+0.36703902770927765j)
16 Execution time: 0:01:20.463164 ovlp:
(0.6813559077965419+0.37223744226483824j)
17 Execution time: 0:01:20.475579 ovlp:
(0.6537150304020851+0.3783286593202462j)
18 Execution time: 0:01:20.490314 ovlp:
(0.6229709443186442+0.37775985772760157j)
x_points = [np.float64(0.0), np.float64(0.2968649242675615),
np.float64(0.593729848535123), np.float64(0.8905947728026845),
np.float64(1.187459697070246), np.float64(1.4843246213378074),
np.float64(1.781189545605369), np.float64(2.0780544698729306),
np.float64(2.374919394140492), np.float64(2.6717843184080534),
np.float64(2.968649242675615), np.float64(3.2655141669431766),
np.float64(3.562379091210738), np.float64(3.8592440154782994),
np.float64(4.156108939745861), np.float64(4.452973864013423),
np.float64(4.749838788280984), np.float64(5.046703712548545),
np.float64(5.343568636816107)] y_points = [1.          +0.j
0.9985527959478286+0.03591730056844167j
0.9937647825413911+0.06954139471590515j
0.9858879604862893+0.10394309104065491j
0.9751455304074852+0.13594718065210576j
0.962099093877463 +0.1665616663726659j
0.9460142488398968+0.19649935019818066j
0.9267181948109455+0.22218902212926195j
0.9065437383224673+0.2518675052290147j
0.8811780672985885+0.27976758334923346j
0.856136397181912 +0.2960756290117612j
0.8306699258757924+0.3146804811053472j
0.8023018464451701+0.3353949391058295j
0.7722345622567743+0.3458925684991918j
0.7435136818383092+0.3581254027511278j
0.7147856013996838+0.36703902770927765j
0.6813559077965419+0.37223744226483824j
0.6537150304020851+0.3783286593202462j

```

0.6229709443186442+0.37775985772760157j]
 fit1: [0.3812089410021308 -0.29630449627405453]
 [0.30460989275562184 -0.33491382288851834 0.36251245867075627
 -0.04016635875780332] 7.448654365403451e-10
 [0.3004937804425536 -0.3366703970113478 0.27644958302360495
 -0.0510877727949202 -0.00321201559697113] 7.24646628199038e-10
 E_gs: -0.3366703970113478
 test mps sampling took: (0.0013113021850585938, Counter({2: 7, 0: 3}))
 truncated ham size: 12 Number of fitting points: 16
 shots per matrix element: 333333.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.005017476957090841
 1 Execution time: 0:01:20.836584 ovlp: (1+0.0011370011370011035j)
 2 Execution time: 0:01:20.838546 ovlp:
 (0.999993999994+0.0029430029430028704j)
 3 Execution time: 0:01:20.841671 ovlp:
 (0.999993999994+0.004647004647004627j)
 4 Execution time: 0:01:20.845223 ovlp:
 (0.999993999994+0.002337002337002403j)
 5 Execution time: 0:01:20.849617 ovlp: (1+0.00236100236100234j)
 6 Execution time: 0:01:20.854294 ovlp:
 (0.9999819999819999+0.00532500532500535j)
 7 Execution time: 0:01:20.860324 ovlp:
 (0.99996999997+0.007347007347007439j)
 8 Execution time: 0:01:20.867219 ovlp:
 (0.9999459999459999+0.00602700602700601j)
 9 Execution time: 0:01:20.874545 ovlp:
 (0.9999759999760001+0.008709008709008703j)
 10 Execution time: 0:01:20.882013 ovlp:
 (0.9999519999519999+0.006921006921006834j)
 11 Execution time: 0:01:20.890122 ovlp:
 (0.99996999997+0.00483300483300475j)
 12 Execution time: 0:01:20.899986 ovlp:
 (0.99993999994+0.008487008487008563j)
 13 Execution time: 0:01:20.909541 ovlp:
 (0.999891999892+0.010119010119010063j)
 14 Execution time: 0:01:20.919535 ovlp:
 (0.9999219999219999+0.009537009537009533j)
 15 Execution time: 0:01:20.931714 ovlp:
 (0.99993999994+0.009243009243009137j)
 x_points = [np.float64(0.0), np.float64(0.005017476957090841),
 np.float64(0.010034953914181683), np.float64(0.015052430871272525),
 np.float64(0.020069907828363365), np.float64(0.025087384785454206),
 np.float64(0.03010486174254505), np.float64(0.03512233869963589),
 np.float64(0.04013981565672673), np.float64(0.045157292613817575),
 np.float64(0.05017476957090841), np.float64(0.055192246527999256),
 np.float64(0.0602097234850901), np.float64(0.06522720044218094),

```

np.float64(0.07024467739927177), np.float64(0.07526215435636262)]
y_points = [1.          +0.j
1.          +0.0011370011370011j
0.999993999994  +0.00294300294300287j
0.999993999994  +0.00464700464700463j
0.999993999994  +0.0023370023370024j
1.          +0.00236100236100234j
0.9999819999819999+0.00532500532500535j
0.99996999997   +0.00734700734700744j
0.9999459999459999+0.00602700602700601j
0.9999759999760001+0.0087090087090087j
0.9999519999519999+0.00692100692100683j
0.99996999997   +0.00483300483300475j
0.99993999994   +0.00848700848700856j
0.999891999892  +0.01011901011901006j
0.9999219999219999+0.00953700953700953j
0.99993999994   +0.00924300924300914j]
fit1: [ 0.06300164847111482 -2.513172948372062 ]
[ 0.06300164847111482 -2.513172948372062  0.06301164837111482
 -0.          ] 1.8354849945052314e-10
[ 5.7399028678879568e-02 -2.2903622876465879e+00
 5.7399090421021662e-02
 -1.0066099941147697e+00  8.9231325105782537e-07]
1.024353628297137e-09
E_gs: -2.290362287646588
test mps sampling took: (0.0012836456298828125, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.03270523252934154
1 Execution time: 0:01:21.124880  ovlp:
(0.9999955999956001+0.004683804683804693j)
2 Execution time: 0:01:21.127517  ovlp:
(0.9999251999251999+0.00650540650540643j)
3 Execution time: 0:01:21.130285  ovlp:
(0.9997799997799999+0.011041811041811123j)
4 Execution time: 0:01:21.133912  ovlp:
(0.9997403997403997+0.016049016049016096j)
5 Execution time: 0:01:21.138653  ovlp:
(0.9995819995819997+0.021065021065021172j)
6 Execution time: 0:01:21.144071  ovlp:
(0.9993619993619993+0.025051425051425102j)
7 Execution time: 0:01:21.149612  ovlp:
(0.998957198957199+0.02334862334862331j)
8 Execution time: 0:01:21.155676  ovlp:
(0.9987855987855987+0.032923032923033j)
9 Execution time: 0:01:21.162362  ovlp:

```

```

(0.9983895983895983+0.03497343497343497j)
10 Execution time: 0:01:21.169709  ovlp:
(0.9980287980287981+0.04021384021384011j)
11 Execution time: 0:01:21.177754  ovlp:
(0.9977735977735978+0.04412104412104423j)
x_points = [np.float64(0.0), np.float64(0.03270523252934154),
np.float64(0.06541046505868307), np.float64(0.0981156975880246),
np.float64(0.13082093011736615), np.float64(0.1635261626467077),
np.float64(0.1962313951760492), np.float64(0.22893662770539075),
np.float64(0.2616418602347323), np.float64(0.29434709276407384),
np.float64(0.3270523252934154), np.float64(0.3597575578227569)] y_points
= [1.          +0.j
0.9999955999956001+0.00468380468380469j
0.9999251999251999+0.00650540650540643j
0.9997799997799999+0.01104181104181112j
0.9997403997403997+0.0160490160490161j
0.9995819995819997+0.02106502106502117j
0.9993619993619993+0.0250514250514251j
0.998957198957199 +0.02334862334862331j
0.9987855987855987+0.032923032923033j
0.9983895983895983+0.03497343497343497j
0.9980287980287981+0.04021384021384011j
0.9977735977735978+0.04412104412104423j]
fit1: [ 0.2838833330040877 -0.4294803729050621]
[ 0.2838833330040877 -0.4294803729050621  0.2838933329040877
 -0.          ] 2.1887607256811352e-10
[ 2.4319865188561782e-01 -3.6866632755795825e-01
 2.4283789316433546e-01
 -1.2275385169753421e-01  1.4565124069566804e-06]
1.3972883088965875e-10
E_gs: -0.36866632755795825
test mps sampling took: (0.0012989044189453125, Counter({0: 7, 2: 3}))
truncated ham size: 12  Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.1902992841212961
1 Execution time: 0:01:21.557642  ovlp:
(0.9993391993391993+0.02214662214662222j)
2 Execution time: 0:01:21.559615  ovlp:
(0.9974715974715975+0.04486584486584477j)
3 Execution time: 0:01:21.562298  ovlp:
(0.9942739942739942+0.06626346626346624j)
4 Execution time: 0:01:21.565681  ovlp:
(0.9896259896259896+0.0888006888006887j)
5 Execution time: 0:01:21.569560  ovlp:
(0.9836227836227835+0.10773990773990771j)
6 Execution time: 0:01:21.574131  ovlp:

```

```

(0.9774627774627775+0.12918512918512914j)
7 Execution time: 0:01:21.579639 ovlp:
(0.9685951685951686+0.1486171486171486j)
x_points = [np.float64(0.0), np.float64(0.1902992841212961),
np.float64(0.3805985682425922), np.float64(0.5708978523638883),
np.float64(0.7611971364851844), np.float64(0.9514964206064804),
np.float64(1.1417957047277767), np.float64(1.3320949888490727)] y_points
= [1.          +0.j
0.9993391993391993+0.0221466221466222j
0.9974715974715975+0.04486584486584477j
0.9942739942739942+0.06626346626346624j
0.9896259896259896+0.0888006888006887j
0.9836227836227835+0.10773990773990771j
0.9774627774627775+0.12918512918512914j
0.9685951685951686+0.1486171486171486j ]
fit1: [ 0.33571943981192076 -0.344663756662105 ]
[ 0.33571943981192076 -0.344663756662105  0.33572943971192076
-0.          ] 1.2685520052872667e-10
[ 2.6906285940911912e-01 -3.2309976571137072e-01
2.7834404019202885e-01
-1.0310262582965506e-01  2.4241768787362624e-06]
2.7632416996513227e-10
E_gs: -0.3230997657113707
test mps sampling took: (0.0013611316680908203, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.04142478359366007
1 Execution time: 0:01:22.410266 ovlp:
(0.9999759999616+0.0022032035251255966j)
2 Execution time: 0:01:22.412264 ovlp:
(0.9998559997695997+0.007348811758098872j)
3 Execution time: 0:01:22.414959 ovlp:
(0.9997215995545592+0.015163224261158792j)
4 Execution time: 0:01:22.418421 ovlp:
(0.9995391992627187+0.02028483245573187j)
5 Execution time: 0:01:22.422350 ovlp:
(0.999203198725118+0.02255523608837784j)
6 Execution time: 0:01:22.426964 ovlp:
(0.9986895979033565+0.030168048268877312j)
7 Execution time: 0:01:22.432435 ovlp:
(0.9986463978342366+0.034728055564889004j)
8 Execution time: 0:01:22.438416 ovlp:
(0.9981663970662353+0.034972855956569626j)
9 Execution time: 0:01:22.446141 ovlp:
(0.9975807961292738+0.04494727191563497j)
10 Execution time: 0:01:22.454737 ovlp:

```

```

(0.9969807951692722+0.047169675471480765j)
11 Execution time: 0:01:22.462983  ovlp:
(0.9962895940633505+0.053068884910215885j)
12 Execution time: 0:01:22.471698  ovlp:
(0.9956751930803089+0.056918491069585686j)
x_points = [np.float64(0.0), np.float64(0.04142478359366007),
np.float64(0.08284956718732014), np.float64(0.12427435078098022),
np.float64(0.1656991343746403), np.float64(0.20712391796830038),
np.float64(0.24854870156196043), np.float64(0.2899734851556205),
np.float64(0.3313982687492806), np.float64(0.37282305234294066),
np.float64(0.41424783593660075), np.float64(0.4556726195302608),
np.float64(0.49709740312392087)] y_points = [1.          +0.j
0.9999759999616  +0.0022032035251256j
0.9998559997695997+0.00734881175809887j
0.9997215995545592+0.01516322426115879j
0.9995391992627187+0.02028483245573187j
0.999203198725118 +0.02255523608837784j
0.9986895979033565+0.03016804826887731j
0.9986463978342366+0.034728055564889j
0.9981663970662353+0.03497285595656963j
0.9975807961292738+0.04494727191563497j
0.9969807951692722+0.04716967547148077j
0.9962895940633505+0.05306888491021589j
0.9956751930803089+0.05691849106958569j]
fit1: [ 0.2745637564147425 -0.41680595182991187]
[ 0.2745637564147425 -0.41680595182991187 0.2745737563147425
-0.          ] 1.1266160744746721e-10
[ 2.3858383640703157e-01 -3.6213123157213684e-01
2.3854834249334222e-01
-1.3086914604350638e-01 1.3157260196018538e-06]
1.7209598661384407e-10
E_gs: -0.36213123157213684
test mps sampling took: (0.001280069351196289, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.005966032764685626
1 Execution time: 0:01:22.943029  ovlp: (1-0.0006162006162006017j)
2 Execution time: 0:01:22.944856  ovlp: (1+0.0014638014638015395j)
3 Execution time: 0:01:22.947374  ovlp:
(0.9999947999948+0.0016926016926017695j)
4 Execution time: 0:01:22.950512  ovlp:
(0.999973999974+0.003627003627003633j)
5 Execution time: 0:01:22.954493  ovlp:
(0.9999843999844+0.0027742027742028164j)
6 Execution time: 0:01:22.959110  ovlp:
(0.999973999974+0.007064207064207073j)

```



```

7 Execution time: 0:01:22.964334  ovlp:
(0.9999583999583999+0.0017082017082017398j)
8 Execution time: 0:01:22.970252  ovlp:
(0.9999791999792+0.008010608010607934j)
9 Execution time: 0:01:22.976949  ovlp:
(0.9999427999427999+0.009809809809809833j)
10 Execution time: 0:01:22.984165  ovlp:
(0.9999479999479999+0.005977405977406036j)
11 Execution time: 0:01:22.992240  ovlp:
(0.9999479999479999+0.006944606944606857j)
12 Execution time: 0:01:23.000790  ovlp:
(0.9998699998699998+0.00608660608660605j)
13 Execution time: 0:01:23.011267  ovlp:
(0.9999167999167999+0.00628940628940633j)
x_points = [np.float64(0.0), np.float64(0.005966032764685626),
np.float64(0.011932065529371252), np.float64(0.017898098294056877),
np.float64(0.023864131058742504), np.float64(0.02983016382342813),
np.float64(0.035796196588113754), np.float64(0.041762229352799385),
np.float64(0.04772826211748501), np.float64(0.05369429488217063),
np.float64(0.05966032764685626), np.float64(0.06562636041154189),
np.float64(0.07159239317622751), np.float64(0.07755842594091314)]
y_points = [1.          +0.j
1.          -0.0006162006162006j
1.          +0.00146380146380154j
0.9999947999948  +0.00169260169260177j
0.999973999974  +0.00362700362700363j
0.9999843999844  +0.00277420277420282j
0.999973999974  +0.00706420706420707j
0.9999583999583999+0.00170820170820174j
0.9999791999792  +0.00801060801060793j
0.9999427999427999+0.00980980980980983j
0.9999479999479999+0.00597740597740604j
0.9999479999479999+0.00694460694460686j
0.9998699998699998+0.00608660608660605j
0.9999167999167999+0.00628940628940633j]
fit1: [ 0.12930643438825962 -0.9700325140504137 ]
[ 0.12930643438825962 -0.9700325140504137  0.12931643428825962
-0.          ] 2.64480887870531e-10
[ 1.1685490722567723e-01 -8.7664591825155702e-01
1.1686231777817059e-01
-3.5765982634306170e-01  9.6321925800716603e-07]
6.878473580352805e-10
E_gs: -0.876645918251557
test mps sampling took: (0.0013093948364257812, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 224 2 qubit gates: 120

```

N gate: 224 dt: 0.08340385901263399

1 Execution time: 0:01:23.213327 ovlp:

(0.9998879997311994+0.01073522576454189j)

2 Execution time: 0:01:23.215318 ovlp:

(0.999490398776957+0.017701642483942015j)

3 Execution time: 0:01:23.218096 ovlp:

(0.9988071971372732+0.028560068544164485j)

4 Execution time: 0:01:23.221624 ovlp:

(0.9979615951078282+0.039737695370468895j)

5 Execution time: 0:01:23.225536 ovlp:

(0.9968975925542221+0.04809851543643706j)

6 Execution time: 0:01:23.231156 ovlp:

(0.9954919891807741+0.05783133879521318j)

7 Execution time: 0:01:23.237371 ovlp:

(0.993739184974044+0.06810176344423224j)

8 Execution time: 0:01:23.244284 ovlp:

(0.992546382111317+0.07701698484076358j)

9 Execution time: 0:01:23.251195 ovlp:

(0.9896119750687402+0.08871541291699092j)

10 Execution time: 0:01:23.258648 ovlp:

(0.9878703708888901+0.09499862799670722j)

11 Execution time: 0:01:23.266768 ovlp:

(0.9851487643570345+0.10129864311674353j)

12 Execution time: 0:01:23.276521 ovlp:

(0.9823823577176585+0.11374747299393517j)

13 Execution time: 0:01:23.287221 ovlp:

(0.9790223496536392+0.12379949711879301j)

14 Execution time: 0:01:23.298643 ovlp:

(0.9766143438744253+0.13538032491277985j)

```
x_points = [np.float64(0.0), np.float64(0.08340385901263399),  
np.float64(0.16680771802526798), np.float64(0.250211577037902),  
np.float64(0.33361543605053595), np.float64(0.4170192950631699),  
np.float64(0.500423154075804), np.float64(0.5838270130884379),  
np.float64(0.6672308721010719), np.float64(0.7506347311137059),  
np.float64(0.8340385901263399), np.float64(0.9174424491389739),  
np.float64(1.000846308151608), np.float64(1.084250167164242),  
np.float64(1.1676540261768757)] y_points = [1.          +0.j
```

0.9998879997311994+0.01073522576454189j

0.999490398776957 +0.01770164248394202j

0.9988071971372732+0.02856006854416449j

0.9979615951078282+0.0397376953704689j

0.9968975925542221+0.04809851543643706j

0.9954919891807741+0.05783133879521318j

0.993739184974044 +0.06810176344423224j

0.992546382111317 +0.07701698484076358j

0.9896119750687402+0.08871541291699092j

0.9878703708888901+0.09499862799670722j

0.9851487643570345+0.10129864311674353j
0.9823823577176585+0.11374747299393517j
0.9790223496536392+0.12379949711879301j
0.9766143438744253+0.13538032491277985j]
fit1: [0.3721294661701419 -0.31129429766807376]
[0.3721294661701419 -0.31129429766807376 0.3721394660701419
-0.] 1.5956900792869144e-10
[2.8049348808838637e-01 -3.5086958332467100e-01
2.9597803370023046e-01
-6.0527201494673138e-02 5.1565194949340455e-06]
1.6243159182801185e-10
E_gs: -0.350869583324671
test mps sampling took: (0.001287221908569336, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.07727369748433231
1 Execution time: 0:01:23.721297 ovlp:
(0.9999119997183992+0.007515224048716851j)
2 Execution time: 0:01:23.723162 ovlp:
(0.999603998732796+0.014960047872153215j)
3 Execution time: 0:01:23.725682 ovlp:
(0.9990319969023902+0.025696082227463224j)
4 Execution time: 0:01:23.729671 ovlp:
(0.9984335949875041+0.034830511457636604j)
5 Execution time: 0:01:23.734166 ovlp:
(0.997175190960611+0.05041536132915625j)
6 Execution time: 0:01:23.739893 ovlp:
(0.9962687880601218+0.05390897250871207j)
7 Execution time: 0:01:23.745732 ovlp:
(0.9948607835545074+0.06063219402302078j)
8 Execution time: 0:01:23.751932 ovlp:
(0.9930391777253686+0.07199303037769722j)
9 Execution time: 0:01:23.758930 ovlp:
(0.9911031715301488+0.07788904924495754j)
10 Execution time: 0:01:23.766447 ovlp:
(0.9893343658699707+0.09021788869724379j)
11 Execution time: 0:01:23.774609 ovlp:
(0.9879879615614771+0.09678270970467096j)
12 Execution time: 0:01:23.783429 ovlp:
(0.9851279524094476+0.10584673870956385j)
13 Execution time: 0:01:23.793048 ovlp:
(0.9826727445527825+0.11465556689781398j)
14 Execution time: 0:01:23.804918 ovlp:
(0.9799887359639552+0.1258052025766483j)
15 Execution time: 0:01:23.816101 ovlp:
(0.9760375233200747+0.1289644126861207j)

16 Execution time: 0:01:23.827891 ovlp:
(0.9743039177725368+0.14174205357457148j)
17 Execution time: 0:01:23.840158 ovlp:
(0.9708455067056214+0.14975887922841347j)
18 Execution time: 0:01:23.855427 ovlp:
(0.966999894399662+0.1608557147382872j)
19 Execution time: 0:01:23.869309 ovlp:
(0.9633302826569046+0.16898694075821052j)
20 Execution time: 0:01:23.885948 ovlp:
(0.9589478686331796+0.17427575768242454j)
21 Execution time: 0:01:23.901116 ovlp:
(0.9544334541870534+0.181254180013376j)
22 Execution time: 0:01:23.916791 ovlp:
(0.9492590376289205+0.19355661938118196j)
x_points = [np.float64(0.0), np.float64(0.07727369748433231),
np.float64(0.15454739496866463), np.float64(0.23182109245299692),
np.float64(0.30909478993732925), np.float64(0.3863684874216616),
np.float64(0.46364218490599385), np.float64(0.5409158823903262),
np.float64(0.6181895798746585), np.float64(0.6954632773589908),
np.float64(0.7727369748433232), np.float64(0.8500106723276555),
np.float64(0.9272843698119877), np.float64(1.0045580672963201),
np.float64(1.0818317647806523), np.float64(1.1591054622649848),
np.float64(1.236379159749317), np.float64(1.3136528572336492),
np.float64(1.3909265547179817), np.float64(1.4682002522023139),
np.float64(1.5454739496866463), np.float64(1.6227476471709785),
np.float64(1.700021344655311)] y_points = [1. +0.j
0.9999119997183992+0.00751522404871685j
0.999603998732796 +0.01496004787215321j
0.9990319969023902+0.02569608222746322j
0.9984335949875041+0.0348305114576366j
0.997175190960611 +0.05041536132915625j
0.9962687880601218+0.05390897250871207j
0.9948607835545074+0.06063219402302078j
0.9930391777253686+0.07199303037769722j
0.9911031715301488+0.07788904924495754j
0.9893343658699707+0.09021788869724379j
0.9879879615614771+0.09678270970467096j
0.9851279524094476+0.10584673870956385j
0.9826727445527825+0.11465556689781398j
0.9799887359639552+0.1258052025766483j
0.9760375233200747+0.1289644126861207j
0.9743039177725368+0.14174205357457148j
0.9708455067056214+0.14975887922841347j
0.966999894399662 +0.1608557147382872j
0.9633302826569046+0.16898694075821052j
0.9589478686331796+0.17427575768242454j
0.9544334541870534+0.181254180013376j

```

0.9492590376289205+0.19355661938118196j]
fit1: [ 0.39155283393336426 -0.2995383600434573 ]
[ 0.39155283393336426 -0.2995383600434573  0.39156283383336427
-0.          ] 7.492756660627343e-10
[ 3.0897169311277894e-01 -3.3762422373729184e-01
3.1975715461903814e-01
-4.1756378811482156e-02  2.7566416260824036e-06]
7.837951823127897e-10
E_gs: -0.33762422373729184
test mps sampling took: (0.001270294189453125, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.16736312073070575
1 Execution time: 0:01:24.410587  ovlp:
(0.9994675994675994+0.018777018777018872j)
2 Execution time: 0:01:24.412458  ovlp:
(0.9979627979627979+0.03697983697983709j)
3 Execution time: 0:01:24.414996  ovlp:
(0.9956087956087956+0.056014256014256025j)
4 Execution time: 0:01:24.418845  ovlp:
(0.9922691922691922+0.07555467555467565j)
5 Execution time: 0:01:24.423137  ovlp:
(0.9873851873851873+0.09568469568469573j)
6 Execution time: 0:01:24.428501  ovlp:
(0.9827651827651827+0.11716551716551726j)
7 Execution time: 0:01:24.434295  ovlp:
(0.9760683760683762+0.13227073227073216j)
8 Execution time: 0:01:24.440313  ovlp:
(0.9694419694419694+0.15327635327635325j)
9 Execution time: 0:01:24.447146  ovlp:
(0.961029161029161+0.16672276672276665j)
10 Execution time: 0:01:24.454569  ovlp:
(0.9517055517055517+0.18666798666798656j)
11 Execution time: 0:01:24.462635  ovlp:
(0.9423951423951424+0.20333960333960333j)
x_points = [np.float64(0.0), np.float64(0.16736312073070575),
np.float64(0.3347262414614115), np.float64(0.5020893621921172),
np.float64(0.669452482922823), np.float64(0.8368156036535288),
np.float64(1.0041787243842344), np.float64(1.1715418451149402),
np.float64(1.338904965845646), np.float64(1.5062680865763518),
np.float64(1.6736312073070576), np.float64(1.8409943280377632)] y_points
= [1.          +0.j
0.9994675994675994+0.01877701877701887j
0.9979627979627979+0.03697983697983709j
0.9956087956087956+0.05601425601425603j
0.9922691922691922+0.07555467555467565j

```

0.9873851873851873+0.09568469568469573j
0.9827651827651827+0.11716551716551726j
0.9760683760683762+0.13227073227073216j
0.9694419694419694+0.15327635327635325j
0.961029161029161 +0.16672276672276665j
0.9517055517055517+0.18666798666798656j
0.9423951423951424+0.20333960333960333j]
fit1: [0.38836912956332126 -0.2987891588590318]
[0.38836912956332126 -0.2987891588590318 0.38837912946332126
-0.] 5.52858797079709e-11
[2.861599522480966e-01 -3.418748850316835e-01
2.991215290506984e-01
-6.159128833817291e-02 -9.087967369087639e-06]
5.963197670966307e-11
E_gs: -0.3418748850316835
test mps sampling took: (0.0012807846069335938, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2791409183773775
1 Execution time: 0:01:24.963224 ovlp:
(0.9987151958886269+0.03140730050336171j)
2 Execution time: 0:01:24.965134 ovlp:
(0.9943415818930621+0.06333380266816846j)
3 Execution time: 0:01:24.967667 ovlp:
(0.9873367594776303+0.09614910767714457j)
4 Execution time: 0:01:24.970917 ovlp:
(0.9785015312048999+0.12788200922242954j)
5 Execution time: 0:01:24.974765 ovlp:
(0.9658910908514908+0.15345489105565147j)
6 Execution time: 0:01:24.979385 ovlp:
(0.9523302474567918+0.18648139674046948j)
7 Execution time: 0:01:24.985611 ovlp:
(0.9349677918969341+0.2160406913302122j)
8 Execution time: 0:01:24.992552 ovlp:
(0.9163645323665035+0.2426431764581647j)
9 Execution time: 0:01:25.000032 ovlp:
(0.8923404554894576+0.26446724629518825j)
10 Execution time: 0:01:25.007369 ovlp:
(0.8719683902988489+0.2860713154282093j)
11 Execution time: 0:01:25.015331 ovlp:
(0.8486131155619698+0.3050177760568833j)
12 Execution time: 0:01:25.024056 ovlp:
(0.8198898236474357+0.3217730296736949j)
13 Execution time: 0:01:25.033592 ovlp:
(0.7965697490231969+0.3379122813193003j)
14 Execution time: 0:01:25.044070 ovlp:

(0.7681280580097856+0.3477771128867613j)
15 Execution time: 0:01:25.054750 ovlp:
(0.7425023760076033+0.3558291386532437j)
16 Execution time: 0:01:25.066795 ovlp:
(0.7135414833327467+0.368448379034813j)
17 Execution time: 0:01:25.079068 ovlp:
(0.6842549896159669+0.37153718891900445j)
18 Execution time: 0:01:25.094200 ovlp:
(0.6567725016720054+0.3772660072512233j)
19 Execution time: 0:01:25.108230 ovlp:
(0.6259108029145692+0.3755412017318456j)
20 Execution time: 0:01:25.124728 ovlp:
(0.6020539265725651+0.3738779964095884j)
21 Execution time: 0:01:25.140025 ovlp:
(0.5746418388538843+0.3721619909183709j)
22 Execution time: 0:01:25.155850 ovlp:
(0.5520609665950931+0.3629483614347566j)
x_points = [np.float64(0.0), np.float64(0.2791409183773775),
np.float64(0.558281836754755), np.float64(0.8374227551321325),
np.float64(1.11656367350951), np.float64(1.3957045918868873),
np.float64(1.674845510264265), np.float64(1.9539864286416424),
np.float64(2.23312734701902), np.float64(2.5122682653963975),
np.float64(2.7914091837737747), np.float64(3.0705501021511523),
np.float64(3.34969102052853), np.float64(3.628831938905907),
np.float64(3.907972857283285), np.float64(4.187113775660662),
np.float64(4.46625469403804), np.float64(4.745395612415417),
np.float64(5.024536530792795), np.float64(5.303677449170172),
np.float64(5.582818367547549), np.float64(5.861959285924927),
np.float64(6.141100204302305)] y_points = [1. +0.j
0.9987151958886269+0.03140730050336171j
0.9943415818930621+0.06333380266816846j
0.9873367594776303+0.09614910767714457j
0.9785015312048999+0.12788200922242954j
0.9658910908514908+0.15345489105565147j
0.9523302474567918+0.18648139674046948j
0.9349677918969341+0.2160406913302122j
0.9163645323665035+0.2426431764581647j
0.8923404554894576+0.26446724629518825j
0.8719683902988489+0.2860713154282093j
0.8486131155619698+0.3050177760568833j
0.8198898236474357+0.3217730296736949j
0.7965697490231969+0.3379122813193003j
0.7681280580097856+0.3477771128867613j
0.7425023760076033+0.3558291386532437j
0.7135414833327467+0.368448379034813j
0.6842549896159669+0.37153718891900445j
0.6567725016720054+0.3772660072512233j

0.6259108029145692+0.3755412017318456j
0.6020539265725651+0.3738779964095884j
0.5746418388538843+0.3721619909183709j
0.5520609665950931+0.3629483614347566j]
fit1: [0.37811628667763664 -0.29386819472311565]
[0.28627950957916937 -0.34371404881329304 0.3779784102866027
-0.04956524776426739] 2.8279344391270615e-09
[0.29155692654997595 -0.3402044043218141 0.2831065219948176
-0.054708226662888 -0.00488390985488679] 2.84395630990589e-09
E_gs: -0.3402044043218141
test mps sampling took: (0.010761737823486328, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.09333005959333633
1 Execution time: 0:01:25.578641 ovlp:
(0.9998415995564787+0.012704435572419515j)
2 Execution time: 0:01:25.580610 ovlp:
(0.999251197903354+0.01949405458335285j)
3 Execution time: 0:01:25.583458 ovlp:
(0.9985311958873484+0.03606130097164262j)
4 Execution time: 0:01:25.586647 ovlp:
(0.9975303930851007+0.04035251298703635j)
5 Execution time: 0:01:25.590441 ovlp:
(0.9959823887506885+0.04850293580822029j)
6 Execution time: 0:01:25.594913 ovlp:
(0.9943551841945157+0.06635178578500023j)
7 Execution time: 0:01:25.600050 ovlp:
(0.9926487794165824+0.07406300737642058j)
8 Execution time: 0:01:25.605761 ovlp:
(0.9902871728040838+0.08399183517713849j)
9 Execution time: 0:01:25.612242 ovlp:
(0.98724876429654+0.09606626898555315j)
10 Execution time: 0:01:25.619382 ovlp:
(0.9849735579259622+0.108543903922931j)
11 Execution time: 0:01:25.627419 ovlp:
(0.9815247482692953+0.11792553019148455j)
12 Execution time: 0:01:25.635990 ovlp:
(0.9779607382900672+0.129207961782293j)
13 Execution time: 0:01:25.646535 ovlp:
(0.9743031280487586+0.13655918236571063j)
14 Execution time: 0:01:25.656896 ovlp:
(0.9694719145213606+0.15210402589127248j)
15 Execution time: 0:01:25.668604 ovlp:
(0.9655767036147702+0.15413443157640838j)
16 Execution time: 0:01:25.680008 ovlp:
(0.960731090047052+0.16793687022323667j)


```

17 Execution time: 0:01:25.691906  ovlp:
(0.9563462777695777+0.1798241035074899j)
18 Execution time: 0:01:25.704662  ovlp:
(0.9505574615608923+0.18640492193378133j)
x_points = [np.float64(0.0), np.float64(0.09333005959333633),
np.float64(0.18666011918667266), np.float64(0.279990178780009),
np.float64(0.3733202383733453), np.float64(0.46665029796668167),
np.float64(0.559980357560018), np.float64(0.6533104171533544),
np.float64(0.7466404767466907), np.float64(0.8399705363400269),
np.float64(0.9333005959333633), np.float64(1.0266306555266997),
np.float64(1.119960715120036), np.float64(1.2132907747133723),
np.float64(1.3066208343067087), np.float64(1.399950893900045),
np.float64(1.4932809534933813), np.float64(1.5866110130867177),
np.float64(1.6799410726800539)] y_points = [1.          +0.j
0.9998415995564787+0.01270443557241951j
0.999251197903354 +0.01949405458335285j
0.9985311958873484+0.03606130097164262j
0.9975303930851007+0.04035251298703635j
0.9959823887506885+0.04850293580822029j
0.9943551841945157+0.06635178578500023j
0.9926487794165824+0.07406300737642058j
0.9902871728040838+0.08399183517713849j
0.98724876429654 +0.09606626898555315j
0.9849735579259622+0.108543903922931j
0.9815247482692953+0.11792553019148455j
0.9779607382900672+0.129207961782293j
0.9743031280487586+0.13655918236571063j
0.9694719145213606+0.15210402589127248j
0.9655767036147702+0.15413443157640838j
0.960731090047052 +0.16793687022323667j
0.9563462777695777+0.1798241035074899j
0.9505574615608923+0.18640492193378133j]
fit1: [ 0.3793488710765978 -0.3064541993939147]
[ 0.3793488710765978 -0.3064541993939147  0.3793588709765978
-0.          ] 9.134916636868944e-10
[ 2.9406409673913853e-01 -3.4531506434562187e-01
2.9337156389193936e-01
-5.1072942347331445e-02  3.4312898518937233e-06]
9.646019418224502e-10
E_gs: -0.34531506434562187
test mps sampling took: (0.0012469291687011719, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.19817861275234866
1 Execution time: 0:01:26.224604  ovlp:
(0.9993103999999999+0.024763199999999985j)

```

```

2 Execution time: 0:01:26.226460 ovlp:
(0.9973456+0.045887999999999993j)
3 Execution time: 0:01:26.229135 ovlp:
(0.9938208+0.068297599999999996j)
4 Execution time: 0:01:26.232331 ovlp:
(0.9887471999999999+0.092244800000000002j)
x_points = [np.float64(0.0), np.float64(0.19817861275234866),
np.float64(0.3963572255046973), np.float64(0.594535838257046),
np.float64(0.7927144510093946)] y_points = [1.          +0.j
0.9993103999999999+0.02476319999999999j
0.9973456      +0.045887999999999993j
0.9938208      +0.068297599999999996j
0.9887471999999999+0.092244800000000002j]
fit1: [ 0.4897389719420364 -0.24457295644042537]
[ 0.4897389719420364 -0.24457295644042537 0.4897489718420364
-0.          ] 7.488186127996191e-11
[ 4.1219882207197156e-01 -2.0755919921794752e-01
4.1328306517591679e-01
-7.6406996420632700e-02 1.5966426841696272e-06]
3.3555727459552593e-10
E_gs: -0.20755919921794752
test mps sampling took: (0.001294851303100586, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.003402432992380242
1 Execution time: 0:01:26.776583 ovlp: (1-0.0007770007770008247j)
2 Execution time: 0:01:26.778643 ovlp: (1+0.0013202013202013863j)
3 Execution time: 0:01:26.781294 ovlp:
(0.9999971999971999+0.0010766010766010137j)
4 Execution time: 0:01:26.784410 ovlp: (1+0.0017906017906017535j)
5 Execution time: 0:01:26.788185 ovlp:
(0.9999971999971999+0.002336602336602267j)
6 Execution time: 0:01:26.793741 ovlp:
(0.9999887999888+0.002429002429002347j)
7 Execution time: 0:01:26.799748 ovlp:
(0.9999943999944001+0.002241402241402346j)
x_points = [np.float64(0.0), np.float64(0.003402432992380242),
np.float64(0.006804865984760484), np.float64(0.010207298977140726),
np.float64(0.013609731969520969), np.float64(0.01701216496190121),
np.float64(0.020414597954281452), np.float64(0.023817030946661696)]
y_points = [1.          +0.j
1.          -0.00077700077700082j
1.          +0.00132020132020139j
0.9999971999971999+0.00107660107660101j
1.          +0.00179060179060175j
0.9999971999971999+0.00233660233660227j

```

0.9999887999888 +0.00242900242900235j
0.9999943999944001+0.00224140224140235j]
fit1: [0.24741646269076956 -1.1133794933300198]
[0.24741646269076956 -1.1133794933300198 0.24742646259076956
-0.] 2.5762061263746323e-10
[2.1705041285906221e-01 -9.7673230871769812e-01
2.1705916988485774e-01
-3.5566994938020324e-01 1.2273215423449924e-06]
3.498852971616764e-10
E_gs: -0.9767323087176981
test mps sampling took: (0.001323699951171875, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.14386716084145634
1 Execution time: 0:01:26.939976 ovlp:
(0.9995968+0.016627200000000064j)
2 Execution time: 0:01:26.941822 ovlp:
(0.9985088+0.037011200000000002j)
3 Execution time: 0:01:26.944859 ovlp:
(0.9966784+0.052435199999999904j)
4 Execution time: 0:01:26.948352 ovlp:
(0.9941439999999999+0.06373120000000001j)
5 Execution time: 0:01:26.952574 ovlp: (0.9902848+0.085696j)
6 Execution time: 0:01:26.957157 ovlp:
(0.98671360000000001+0.099929600000000006j)
7 Execution time: 0:01:26.962429 ovlp:
(0.98215040000000001+0.11422719999999997j)
8 Execution time: 0:01:26.968226 ovlp:
(0.9764864+0.132608000000000006j)
9 Execution time: 0:01:26.974889 ovlp:
(0.9707712+0.14724479999999995j)
10 Execution time: 0:01:26.982138 ovlp:
(0.9643839999999999+0.159673600000000008j)
11 Execution time: 0:01:26.990013 ovlp:
(0.9563264+0.17704319999999996j)
12 Execution time: 0:01:26.998536 ovlp:
(0.94899200000000001+0.19443199999999994j)
13 Execution time: 0:01:27.009569 ovlp:
(0.94027520000000001+0.206304000000000004j)
14 Execution time: 0:01:27.020216 ovlp:
(0.9308415999999999+0.2178431999999999j)
15 Execution time: 0:01:27.030771 ovlp:
(0.9203264+0.23286399999999996j)
16 Execution time: 0:01:27.042181 ovlp:
(0.9102336+0.24636159999999996j)
x_points = [np.float64(0.0), np.float64(0.14386716084145634),

```

np.float64(0.2877343216829127), np.float64(0.43160148252436903),
np.float64(0.5754686433658254), np.float64(0.7193358042072817),
np.float64(0.8632029650487381), np.float64(1.0070701258901944),
np.float64(1.1509372867316507), np.float64(1.294804447573107),
np.float64(1.4386716084145634), np.float64(1.5825387692560198),
np.float64(1.7264059300974761), np.float64(1.8702730909389325),
np.float64(2.014140251780389), np.float64(2.158007412621845),
np.float64(2.3018745734633015)] y_points = [1.          +0.j
0.9995968      +0.016627200000000006j
0.9985088      +0.037011200000000002j
0.9966784      +0.05243519999999999j
0.9941439999999999+0.06373120000000001j
0.9902848      +0.085696j
0.9867136000000001+0.099929600000000006j
0.9821504000000001+0.11422719999999997j
0.9764864      +0.132608000000000006j
0.9707712      +0.14724479999999995j
0.9643839999999999+0.159673600000000008j
0.9563264      +0.17704319999999996j
0.9489920000000001+0.19443199999999994j
0.9402752000000001+0.20630400000000004j
0.9308415999999999+0.2178431999999999j
0.9203264      +0.23286399999999996j
0.9102336      +0.24636159999999996j]
fit1: [ 0.38088511296930555 -0.30588236925464685]
[ 0.38088511296930555 -0.30588236925464685 0.38089511286930555
 -0.          ] 2.2493034436027475e-10
[ 2.6922428583635988e-01 -3.5546878817136079e-01
 2.9108507443428944e-01
 -7.3182216790451018e-02 4.1197707096676359e-06]
2.080363145224363e-10
E_gs: -0.3554687881713608
test mps sampling took: (0.0012965202331542969, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.18163835499298042
1 Execution time: 0:01:27.439342 ovlp:
(0.9994111999999999+0.022208000000000006j)
2 Execution time: 0:01:27.441212 ovlp:
(0.9975296+0.0440191999999999925j)
3 Execution time: 0:01:27.443710 ovlp:
(0.9946432000000001+0.0611839999999999905j)
4 Execution time: 0:01:27.446974 ovlp:
(0.9903872+0.082278400000000008j)
5 Execution time: 0:01:27.450738 ovlp:
(0.9852863999999999+0.10134400000000001j)

```

```

6 Execution time: 0:01:27.455257  ovlp: (0.9794176000000001+0.1232704j)
7 Execution time: 0:01:27.460422  ovlp: (0.972288+0.14286719999999997j)
8 Execution time: 0:01:27.466193  ovlp:
(0.9635328000000001+0.16532480000000005j)
9 Execution time: 0:01:27.472672  ovlp:
(0.9536704+0.18289920000000004j)
10 Execution time: 0:01:27.479828  ovlp:
(0.9438336+0.19997440000000001j)
11 Execution time: 0:01:27.487587  ovlp:
(0.9316352000000001+0.21943040000000003j)
12 Execution time: 0:01:27.496003  ovlp: (0.9207424+0.2342784j)
13 Execution time: 0:01:27.505205  ovlp:
(0.9072256000000001+0.25167359999999994j)
14 Execution time: 0:01:27.515081  ovlp:
(0.8926335999999999+0.26600320000000001j)
15 Execution time: 0:01:27.525809  ovlp:
(0.8790655999999999+0.27885439999999995j)
16 Execution time: 0:01:27.537258  ovlp:
(0.8620672+0.29370880000000001j)
x_points = [np.float64(0.0), np.float64(0.18163835499298042),
np.float64(0.36327670998596084), np.float64(0.5449150649789413),
np.float64(0.7265534199719217), np.float64(0.9081917749649021),
np.float64(1.0898301299578825), np.float64(1.271468484950863),
np.float64(1.4531068399438434), np.float64(1.6347451949368237),
np.float64(1.8163835499298042), np.float64(1.9980219049227848),
np.float64(2.179660259915765), np.float64(2.3612986149087454),
np.float64(2.542936969901726), np.float64(2.7245753248947064),
np.float64(2.9062136798876868)] y_points = [1.          +0.j
0.9994111999999999+0.022208000000000001j
0.9975296          +0.044019199999999993j
0.9946432000000001+0.061183999999999991j
0.9903872          +0.082278400000000008j
0.9852863999999999+0.10134400000000001j
0.9794176000000001+0.1232704j
0.972288          +0.14286719999999997j
0.9635328000000001+0.16532480000000005j
0.9536704          +0.18289920000000004j
0.9438336          +0.19997440000000001j
0.9316352000000001+0.21943040000000003j
0.9207424          +0.2342784j
0.9072256000000001+0.25167359999999994j
0.8926335999999999+0.26600320000000001j
0.8790655999999999+0.27885439999999995j
0.8620672          +0.29370880000000001j ]
fit1: [ 0.38506745024239203 -0.30054227673586126]
[ 0.38506745024239203 -0.30054227673586126 0.38507745014239203
-0.          ] 9.179606397877255e-11

```

[3.1165100882544255e-01 -3.3180501247217725e-01
 2.4821800590189427e-01
 -5.2363089706648283e-02 4.4469300137731785e-06]
 7.76879874681116e-11
 E_gs: -0.33180501247217725
 test mps sampling took: (0.0012712478637695312, Counter({0: 5, 2: 5}))
 truncated ham size: 12 Number of fitting points: 18
 shots per matrix element: 294117.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.009144996581288013
 1 Execution time: 0:01:27.981586 ovlp: (1+0.0030838067843750316j)
 2 Execution time: 0:01:27.983477 ovlp:
 (0.99997959995512+0.005504612110146745j)
 3 Execution time: 0:01:27.986561 ovlp:
 (0.99998639997008-0.0005814012790827938j)
 4 Execution time: 0:01:27.990055 ovlp:
 (0.9999591999102397+0.007497016493436259j)
 5 Execution time: 0:01:27.994343 ovlp:
 (0.9999319998503997+0.00037060081532169775j)
 6 Execution time: 0:01:27.998948 ovlp:
 (0.9999523998952797+0.008081817779999056j)
 7 Execution time: 0:01:28.004286 ovlp:
 (0.9999047997905595+0.009958621908968235j)
 8 Execution time: 0:01:28.010248 ovlp:
 (0.9998911997606394+0.010026622058568524j)
 9 Execution time: 0:01:28.016811 ovlp:
 (0.9999047997905595+0.0073270161194354255j)
 10 Execution time: 0:01:28.024074 ovlp:
 (0.9998707997157594+0.01242022732450021j)
 11 Execution time: 0:01:28.031856 ovlp:
 (0.9997687994913589+0.011026224257693285j)
 12 Execution time: 0:01:28.040259 ovlp:
 (0.9998027995661591+0.013719030181866376j)
 13 Execution time: 0:01:28.049884 ovlp:
 (0.9997483994464789+0.013249829149624137j)
 14 Execution time: 0:01:28.059819 ovlp:
 (0.9997143993716786+0.01732303811068392j)
 15 Execution time: 0:01:28.070791 ovlp:
 (0.999591999102398+0.01689463716820172j)
 16 Execution time: 0:01:28.082533 ovlp:
 (0.9996259991771983+0.01858784089325005j)
 17 Execution time: 0:01:28.094359 ovlp:
 (0.999571599057518+0.02110384642846208j)
 x_points = [np.float64(0.0), np.float64(0.009144996581288013),
 np.float64(0.018289993162576026), np.float64(0.02743498974386404),
 np.float64(0.03657998632515205), np.float64(0.045724982906440066),
 np.float64(0.05486997948772808), np.float64(0.0640149760690161),

```

np.float64(0.0731599726503041), np.float64(0.08230496923159211),
np.float64(0.09144996581288013), np.float64(0.10059496239416815),
np.float64(0.10973995897545616), np.float64(0.11888495555674417),
np.float64(0.1280299521380322), np.float64(0.1371749487193202),
np.float64(0.1463199453006082), np.float64(0.15546494188189622)]
y_points = [1.          +0.j
1.          +0.00308380678437503j
0.99997959995512 +0.00550461211014674j
0.99998639997008 -0.00058140127908279j
0.9999591999102397+0.00749701649343626j
0.9999319998503997+0.0003706008153217j
0.9999523998952797+0.00808181777999906j
0.9999047997905595+0.00995862190896823j
0.9998911997606394+0.01002662205856852j
0.9999047997905595+0.00732701611943543j
0.9998707997157594+0.01242022732450021j
0.9997687994913589+0.01102622425769328j
0.9998027995661591+0.01371903018186638j
0.9997483994464789+0.01324982914962414j
0.9997143993716786+0.01732303811068392j
0.999591999102398 +0.01689463716820172j
0.9996259991771983+0.01858784089325005j
0.999571599057518 +0.02110384642846208j]
fit1: [ 0.08100593422764364 -1.513085169364621 ]
[ 0.08100593422764364 -1.513085169364621  0.08101593412764364
-0.          ] 7.027633943628143e-10
[ 7.1818764374896690e-02 -1.3499989145842306e+00
7.1545729887434989e-02
-5.3756807355096203e-01 1.2044932781745792e-06]
9.94777933423234e-10
E_gs: -1.3499989145842306
test mps sampling took: (0.0012788772583007812, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2723738440434794
1 Execution time: 0:01:28.349239 ovlp:
(0.9987315987315988+0.03022743022743013j)
2 Execution time: 0:01:28.351083 ovlp:
(0.9946491946491947+0.0643650643650644j)
3 Execution time: 0:01:28.353603 ovlp:
(0.9882819882819882+0.0985446985446985j)
4 Execution time: 0:01:28.356967 ovlp:
(0.979117579117579+0.11645351645351654j)
5 Execution time: 0:01:28.360799 ovlp:
(0.9675591675591675+0.15262395262395256j)
6 Execution time: 0:01:28.365266 ovlp:

```

```

(0.9534555534555536+0.1855855855855857j)
7 Execution time: 0:01:28.371290 ovlp:
(0.936957936957937+0.20982800982800986j)
8 Execution time: 0:01:28.378044 ovlp:
(0.918948318948319+0.23501963501963496j)
9 Execution time: 0:01:28.385019 ovlp:
(0.8988386988386989+0.25761565761565763j)
10 Execution time: 0:01:28.392285 ovlp:
(0.8794514794514794+0.28048888048888054j)
11 Execution time: 0:01:28.401200 ovlp:
(0.852999852999853+0.29999369999370007j)
12 Execution time: 0:01:28.411055 ovlp:
(0.828942228942229+0.31892731892731896j)
13 Execution time: 0:01:28.420277 ovlp:
(0.8024906024906024+0.33235053235053225j)
14 Execution time: 0:01:28.430242 ovlp:
(0.7795585795585795+0.34545454545454546j)
15 Execution time: 0:01:28.442532 ovlp:
(0.7501165501165501+0.3601797601797603j)
16 Execution time: 0:01:28.454254 ovlp:
(0.7227325227325228+0.36873936873936874j)
17 Execution time: 0:01:28.466380 ovlp:
(0.6974400974400974+0.3705453705453705j)
18 Execution time: 0:01:28.479077 ovlp:
(0.6690648690648691+0.37491337491337484j)
19 Execution time: 0:01:28.494860 ovlp:
(0.6415044415044415+0.37604737604737615j)
20 Execution time: 0:01:28.508954 ovlp:
(0.6149436149436149+0.37404817404817403j)
21 Execution time: 0:01:28.523587 ovlp:
(0.5897939897939899+0.3733845733845733j)
x_points = [np.float64(0.0), np.float64(0.2723738440434794),
np.float64(0.5447476880869588), np.float64(0.8171215321304383),
np.float64(1.0894953761739177), np.float64(1.3618692202173972),
np.float64(1.6342430642608765), np.float64(1.9066169083043558),
np.float64(2.1789907523478353), np.float64(2.451364596391315),
np.float64(2.7237384404347944), np.float64(2.9961122844782735),
np.float64(3.268486128521753), np.float64(3.5408599725652325),
np.float64(3.8132338166087116), np.float64(4.085607660652191),
np.float64(4.357981504695671), np.float64(4.63035534873915),
np.float64(4.90272919278263), np.float64(5.175103036826109),
np.float64(5.447476880869589), np.float64(5.7198507249130675)] y_points
= [1.          +0.j
0.9987315987315988+0.03022743022743013j
0.9946491946491947+0.0643650643650644j
0.9882819882819882+0.0985446985446985j
0.979117579117579 +0.11645351645351654j

```


0.9675591675591675+0.15262395262395256j
 0.9534555534555536+0.1855855855855857j
 0.936957936957937 +0.20982800982800986j
 0.918948318948319 +0.23501963501963496j
 0.8988386988386989+0.25761565761565763j
 0.8794514794514794+0.28048888048888054j
 0.852999852999853 +0.29999369999370007j
 0.828942228942229 +0.31892731892731896j
 0.8024906024906024+0.33235053235053225j
 0.7795585795585795+0.34545454545454546j
 0.7501165501165501+0.3601797601797603j
 0.7227325227325228+0.36873936873936874j
 0.6974400974400974+0.3705453705453705j
 0.6690648690648691+0.37491337491337484j
 0.6415044415044415+0.37604737604737615j
 0.6149436149436149+0.37404817404817403j
 0.5897939897939899+0.3733845733845733j]
 fit1: [0.37981481514510085 -0.29500867813687104]
 [0.2958763857171135 -0.3386438618639869 0.3796843538646683
 -0.04364852765951686] 3.6655728010882556e-09
 [0.2981991939189549 -0.33698133395104485 0.28447000071371925
 -0.05052910038844752 -0.0041556685584117] 3.62356428236416e-09
 E_gs: -0.33698133395104485
 test mps sampling took: (0.0012798309326171875, Counter({2: 5, 0: 5}))
 truncated ham size: 12 Number of fitting points: 19
 shots per matrix element: 277777.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.07424541770067783
 1 Execution time: 0:01:28.859723 ovlp:
 (0.9998919996975992+0.007268420351576932j)
 2 Execution time: 0:01:28.861586 ovlp:
 (0.9996399989919971+0.016398045914528536j)
 3 Execution time: 0:01:28.864151 ovlp:
 (0.9990639973791926+0.0289404810333469j)
 4 Execution time: 0:01:28.867560 ovlp:
 (0.9985023958067083+0.03253329109321501j)
 5 Execution time: 0:01:28.871553 ovlp:
 (0.9975447931254207+0.04087811445872047j)
 6 Execution time: 0:01:28.876070 ovlp:
 (0.9962343894562904+0.052916548166334954j)
 7 Execution time: 0:01:28.882134 ovlp:
 (0.9948447855653997+0.06076457014079639j)
 8 Execution time: 0:01:28.888852 ovlp:
 (0.99362798215835+0.06779898983717159j)
 9 Execution time: 0:01:28.896045 ovlp:
 (0.992209578186819+0.07785021798061043j)
 10 Execution time: 0:01:28.903364 ovlp:

```

(0.9904239731871249+0.08466863707218386j)
11 Execution time: 0:01:28.911100  ovlp:
(0.9885303678850301+0.0957134679977103j)
12 Execution time: 0:01:28.919761  ovlp:
(0.9859311606072496+0.10035748100094688j)
13 Execution time: 0:01:28.929034  ovlp:
(0.9837351544584325+0.11115031122087138j)
14 Execution time: 0:01:28.938968  ovlp:
(0.9810999470798518+0.12153274029167282j)
15 Execution time: 0:01:28.949714  ovlp:
(0.97832073929807+0.12558635164178455j)
16 Execution time: 0:01:28.961019  ovlp:
(0.9743679282301991+0.1323759706527179j)
17 Execution time: 0:01:28.972850  ovlp:
(0.9728055238554667+0.14534320696097947j)
18 Execution time: 0:01:28.985610  ovlp:
(0.9692343138560788+0.1520968258711124j)
x_points = [np.float64(0.0), np.float64(0.07424541770067783),
np.float64(0.14849083540135566), np.float64(0.2227362531020335),
np.float64(0.2969816708027113), np.float64(0.37122708850338915),
np.float64(0.445472506204067), np.float64(0.5197179239047448),
np.float64(0.5939633416054226), np.float64(0.6682087593061005),
np.float64(0.7424541770067783), np.float64(0.8166995947074561),
np.float64(0.890945012408134), np.float64(0.9651904301088118),
np.float64(1.0394358478094896), np.float64(1.1136812655101673),
np.float64(1.1879266832108453), np.float64(1.2621721009115232),
np.float64(1.336417518612201)] y_points = [1.          +0.j
0.9998919996975992+0.00726842035157693j
0.9996399989919971+0.01639804591452854j
0.9990639973791926+0.0289404810333469j
0.9985023958067083+0.03253329109321501j
0.9975447931254207+0.04087811445872047j
0.9962343894562904+0.05291654816633495j
0.9948447855653997+0.06076457014079639j
0.99362798215835  +0.06779898983717159j
0.992209578186819 +0.07785021798061043j
0.9904239731871249+0.08466863707218386j
0.9885303678850301+0.0957134679977103j
0.9859311606072496+0.10035748100094688j
0.9837351544584325+0.11115031122087138j
0.9810999470798518+0.12153274029167282j
0.97832073929807  +0.12558635164178455j
0.9743679282301991+0.1323759706527179j
0.9728055238554667+0.14534320696097947j
0.9692343138560788+0.1520968258711124j ]
fit1: [ 0.38053978832805924 -0.3053583538053213 ]
[ 0.38053978832805924 -0.3053583538053213  0.38054978822805924

```

```

-0.          ] 1.5824085437951995e-10
[ 2.8043689508039965e-01 -3.5121172664774264e-01
2.6674885991401853e-01
-6.8260693686773816e-02 3.5864943131797195e-06]
1.5829316392680074e-10
E_gs: -0.35121172664774264
test mps sampling took: (0.0012824535369873047, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2765643779297246
1 Execution time: 0:01:29.457032 ovlp:
(0.9986799994719997+0.03216841286736516j)
2 Execution time: 0:01:29.458891 ovlp:
(0.9947055978822392+0.06471002588401031j)
3 Execution time: 0:01:29.461395 ovlp:
(0.987870395148158+0.09514203805681531j)
4 Execution time: 0:01:29.464650 ovlp:
(0.9786615914646366+0.1248852499541j)
5 Execution time: 0:01:29.468454 ovlp:
(0.9662583865033545+0.15670446268178506j)
6 Execution time: 0:01:29.472982 ovlp:
(0.9521463808585524+0.18366847346738946j)
x_points = [np.float64(0.0), np.float64(0.2765643779297246),
np.float64(0.5531287558594492), np.float64(0.8296931337891738),
np.float64(1.1062575117188984), np.float64(1.382821889648623),
np.float64(1.6593862675783475)] y_points = [1.          +0.j
0.9986799994719997+0.03216841286736516j
0.9947055978822392+0.06471002588401031j
0.987870395148158 +0.09514203805681531j
0.9786615914646366+0.1248852499541j
0.9662583865033545+0.15670446268178506j
0.9521463808585524+0.18366847346738946j]
fit1: [ 0.39867676736345353 -0.29049886745793113]
[ 0.39867676736345353 -0.29049886745793113 0.39868676726345353
-0.          ] 3.938020212971399e-11
[ 2.831430939492925e-01 -3.434797092934593e-01
3.033839164057793e-01
-6.264537538350458e-02 4.277862662175125e-06]
7.515501893483027e-12
E_gs: -0.3434797092934593
test mps sampling took: (0.0013098716735839844, Counter({0: 8, 2: 2}))
truncated ham size: 12 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.10058288097623976
1 Execution time: 0:01:30.050317 ovlp:

```

```

(0.99980079992032+0.011449204579681904j)
2 Execution time: 0:01:30.052154  ovlp:
(0.9992919997167999+0.024524409809763892j)
3 Execution time: 0:01:30.054673  ovlp:
(0.9983559993423998+0.03358921343568544j)
4 Execution time: 0:01:30.057984  ovlp:
(0.9969279987711994+0.04515961806384716j)
5 Execution time: 0:01:30.061808  ovlp:
(0.9955551982220794+0.057932423172969205j)
6 Execution time: 0:01:30.066358  ovlp:
(0.993577597431039+0.0710748284299314j)
x_points = [np.float64(0.0), np.float64(0.10058288097623976),
np.float64(0.2011657619524795), np.float64(0.3017486429287193),
np.float64(0.402331523904959), np.float64(0.5029144048811988),
np.float64(0.6034972858574386)] y_points = [1.          +0.j
0.99980079992032 +0.0114492045796819j
0.9992919997167999+0.02452440980976389j
0.9983559993423998+0.03358921343568544j
0.9969279987711994+0.04515961806384716j
0.9955551982220794+0.05793242317296921j
0.993577597431039 +0.0710748284299314j ]
fit1: [ 0.27874671629976816 -0.4192962778398963 ]
[ 0.27874671629976816 -0.4192962778398963  0.27875671619976816
-0.          ] 4.5337848592210157e-11
[ 2.4303655596653878e-01 -3.6578165498451704e-01
2.4286404095234052e-01
-1.3006373447681974e-01  1.2955233342888887e-06]
9.616204594036254e-11
E_gs: -0.36578165498451704
test mps sampling took: (0.0013048648834228516, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2539939321884922
1 Execution time: 0:01:30.679860  ovlp:
(0.9989751989751989+0.02734622734622727j)
2 Execution time: 0:01:30.681733  ovlp:
(0.9960099960099996+0.061206661206661295j)
3 Execution time: 0:01:30.684872  ovlp:
(0.9895503895503897+0.08698628698628696j)
4 Execution time: 0:01:30.688432  ovlp:
(0.9812343812343813+0.12109032109032114j)
5 Execution time: 0:01:30.692706  ovlp:
(0.9723639723639723+0.14402234402234404j)
6 Execution time: 0:01:30.697761  ovlp:
(0.9610743610743611+0.172968772968773j)
7 Execution time: 0:01:30.703516  ovlp:

```

```

(0.9447951447951448+0.19582519582519575j)
8 Execution time: 0:01:30.710269 ovlp:
(0.9305235305235304+0.21971481971481976j)
9 Execution time: 0:01:30.717140 ovlp:
(0.9114219114219113+0.24420924420924428j)
10 Execution time: 0:01:30.724512 ovlp:
(0.8939666939666939+0.26479766479766487j)
11 Execution time: 0:01:30.732458 ovlp:
(0.8722106722106722+0.2857724857724857j)
12 Execution time: 0:01:30.741038 ovlp:
(0.8503034503034503+0.30252210252210254j)
13 Execution time: 0:01:30.750520 ovlp:
(0.8277914277914278+0.317003717003717j)
14 Execution time: 0:01:30.762042 ovlp:
(0.8034398034398034+0.33646653646653646j)
15 Execution time: 0:01:30.773060 ovlp:
(0.7772821772821772+0.34631974631974627j)
16 Execution time: 0:01:30.784785 ovlp:
(0.7541821541821543+0.353115353115353j)
17 Execution time: 0:01:30.856782 ovlp:
(0.7288981288981289+0.36590016590016594j)
18 Execution time: 0:01:30.878848 ovlp:
(0.7027321027321027+0.3691509691509691j)
19 Execution time: 0:01:30.892193 ovlp:
(0.675986475986476+0.3747285747285747j)
20 Execution time: 0:01:30.908915 ovlp:
(0.6516516516516517+0.37963417963417956j)
21 Execution time: 0:01:30.923910 ovlp:
(0.6256116256116255+0.3794157794157793j)
x_points = [np.float64(0.0), np.float64(0.2539939321884922),
np.float64(0.5079878643769844), np.float64(0.7619817965654766),
np.float64(1.0159757287539688), np.float64(1.2699696609424609),
np.float64(1.5239635931309532), np.float64(1.7779575253194455),
np.float64(2.0319514575079376), np.float64(2.2859453896964297),
np.float64(2.5399393218849218), np.float64(2.7939332540734143),
np.float64(3.0479271862619064), np.float64(3.3019211184503985),
np.float64(3.555915050638891), np.float64(3.809908982827383),
np.float64(4.063902915015875), np.float64(4.317896847204367),
np.float64(4.571890779392859), np.float64(4.8258847115813515),
np.float64(5.0798786437698435), np.float64(5.3338725759583365)]
y_points = [1. +0.j
0.9989751989751989+0.02734622734622727j
0.996009996009996 +0.06120666120666129j
0.9895503895503897+0.08698628698628696j
0.9812343812343813+0.12109032109032114j
0.9723639723639723+0.14402234402234404j
0.9610743610743611+0.172968772968773j

```

0.9447951447951448+0.19582519582519575j
0.9305235305235304+0.21971481971481976j
0.9114219114219113+0.24420924420924428j
0.8939666939666939+0.26479766479766487j
0.8722106722106722+0.2857724857724857j
0.8503034503034503+0.30252210252210254j
0.8277914277914278+0.317003717003717j
0.8034398034398034+0.33646653646653646j
0.7772821772821772+0.34631974631974627j
0.7541821541821543+0.353115353115353j
0.7288981288981289+0.36590016590016594j
0.7027321027321027+0.3691509691509691j
0.675986475986476 +0.3747285747285747j
0.6516516516516517+0.37963417963417956j
0.6256116256116255+0.3794157794157793j]
fit1: [0.3824560159875524 -0.29507235003270726]
[0.3004842641796313 -0.3363810694470768 0.3823682510370194
-0.04082092679880404] 1.0024132725166788e-09
[0.28777925779256813 -0.3425837018644965 0.27881940279527445
-0.06012025460202768 -0.00390710404183694] 9.873122601015585e-10
E_gs: -0.3425837018644965
test mps sampling took: (0.0013155937194824219, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.21919758844129608
1 Execution time: 0:01:31.300284 ovlp:
(0.9992619992619993+0.027711027711027736j)
2 Execution time: 0:01:31.302395 ovlp:
(0.9965559965559965+0.05012105012105006j)
3 Execution time: 0:01:31.305108 ovlp:
(0.9923379923379922+0.07682107682107686j)
4 Execution time: 0:01:31.308282 ovlp:
(0.9862479862479863+0.09995109995109996j)
5 Execution time: 0:01:31.312056 ovlp:
(0.9785199785199785+0.12520512520512517j)
6 Execution time: 0:01:31.317393 ovlp:
(0.9692139692139692+0.14852114852114862j)
7 Execution time: 0:01:31.323307 ovlp:
(0.9595299595299596+0.17160317160317162j)
8 Execution time: 0:01:31.330028 ovlp:
(0.9464139464139465+0.1935271935271936j)
9 Execution time: 0:01:31.336634 ovlp:
(0.9331779331779331+0.2135432135432136j)
10 Execution time: 0:01:31.344107 ovlp:
(0.917979917979918+0.23300723300723303j)
11 Execution time: 0:01:31.352072 ovlp:

```

(0.9032439032439032+0.2528012528012529j)
12 Execution time: 0:01:31.360598  ovlp:
(0.8854598854598854+0.2729852729852731j)
13 Execution time: 0:01:31.370023  ovlp:
(0.8678438678438678+0.2895512895512895j)
14 Execution time: 0:01:31.381671  ovlp:
(0.8494958494958496+0.30410730410730413j)
15 Execution time: 0:01:31.392544  ovlp:
(0.8289818289818289+0.318009318009318j)
x_points = [np.float64(0.0), np.float64(0.21919758844129608),
np.float64(0.43839517688259216), np.float64(0.6575927653238882),
np.float64(0.8767903537651843), np.float64(1.0959879422064804),
np.float64(1.3151855306477764), np.float64(1.5343831190890727),
np.float64(1.7535807075303687), np.float64(1.9727782959716647),
np.float64(2.191975884412961), np.float64(2.411173472854257),
np.float64(2.630371061295553), np.float64(2.849568649736849),
np.float64(3.0687662381781453), np.float64(3.2879638266194413)] y_points
= [1.          +0.j
0.9992619992619993+0.02771102771102774j
0.9965559965559965+0.05012105012105006j
0.9923379923379922+0.07682107682107686j
0.9862479862479863+0.09995109995109996j
0.9785199785199785+0.12520512520512517j
0.9692139692139692+0.14852114852114862j
0.9595299595299596+0.17160317160317162j
0.9464139464139465+0.1935271935271936j
0.9331779331779331+0.2135432135432136j
0.917979917979918 +0.23300723300723303j
0.9032439032439032+0.2528012528012529j
0.8854598854598854+0.2729852729852731j
0.8678438678438678+0.2895512895512895j
0.8494958494958496+0.30410730410730413j
0.8289818289818289+0.318009318009318j ]
fit1: [ 0.3806161582189967 -0.3023054848101072]
[ 0.3806161582189967 -0.3023054848101072  0.3806261581189967
 -0.          ] 6.505321731523991e-11
[ 2.7846947314857379e-01 -3.4999591305397387e-01
 3.0177285324229419e-01
 -6.3165878282528218e-02  2.9642799259382453e-06]
3.981818749616792e-11
E_gs: -0.3499959130539739
test mps sampling took: (0.0012865066528320312, Counter({0: 5, 2: 5}))
truncated ham size: 12  Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.19720975198272966
1 Execution time: 0:01:31.818797  ovlp:

```

(0.9992363989309585+0.02502863504008901j)
2 Execution time: 0:01:31.820640 ovlp:
(0.9973227962519147+0.04428426199796687j)
3 Execution time: 0:01:31.823195 ovlp:
(0.9935415909582272+0.07142429999402j)
4 Execution time: 0:01:31.826465 ovlp:
(0.9894659852523793+0.08931832504565507j)
5 Execution time: 0:01:31.830276 ovlp:
(0.9826671757340459+0.10994475392265546j)
6 Execution time: 0:01:31.834761 ovlp:
(0.9756199658679523+0.13642239099134734j)
7 Execution time: 0:01:31.839942 ovlp:
(0.9665211531296143+0.15266961373745924j)
8 Execution time: 0:01:31.845819 ovlp:
(0.9570083398116758+0.17818124945374914j)
9 Execution time: 0:01:31.852357 ovlp:
(0.9462995248193347+0.19577167408034368j)
10 Execution time: 0:01:31.859525 ovlp:
(0.9331803064524291+0.2166465033051046j)
11 Execution time: 0:01:31.868639 ovlp:
(0.9197850876991227+0.23654613116458356j)
12 Execution time: 0:01:31.878394 ovlp:
(0.9059482683275757+0.2492237489132485j)
13 Execution time: 0:01:31.887672 ovlp:
(0.8891030447442627+0.26692457369440326j)
14 Execution time: 0:01:31.897743 ovlp:
(0.8732330225262315+0.2848277987589183j)
15 Execution time: 0:01:31.908382 ovlp:
(0.8579426011196416+0.29715581601814245j)
16 Execution time: 0:01:31.919808 ovlp:
(0.8399565759392063+0.31164583630417075j)
17 Execution time: 0:01:31.931716 ovlp:
(0.8230653522914932+0.32379905331867476j)
18 Execution time: 0:01:31.946369 ovlp:
(0.8045365263511368+0.3332750665850932j)
19 Execution time: 0:01:31.960009 ovlp:
(0.7863113008358211+0.3400278760390265j)
20 Execution time: 0:01:31.974378 ovlp:
(0.7649948709928194+0.3528802940324116j)
21 Execution time: 0:01:31.991526 ovlp:
(0.7468432455805438+0.3607187050061871j)
22 Execution time: 0:01:32.007310 ovlp:
(0.7269252176953047+0.3659075122705171j)
23 Execution time: 0:01:32.023198 ovlp:
(0.7087459922443891+0.3721267209774093j)
x_points = [np.float64(0.0), np.float64(0.19720975198272966),
np.float64(0.39441950396545933), np.float64(0.591629255948189),


```

np.float64(0.7888390079309187), np.float64(0.9860487599136483),
np.float64(1.183258511896378), np.float64(1.3804682638791077),
np.float64(1.5776780158618373), np.float64(1.774887767844567),
np.float64(1.9720975198272965), np.float64(2.1693072718100264),
np.float64(2.366517023792756), np.float64(2.5637267757754856),
np.float64(2.7609365277582154), np.float64(2.958146279740945),
np.float64(3.1553560317236746), np.float64(3.3525657837064045),
np.float64(3.549775535689134), np.float64(3.7469852876718637),
np.float64(3.944195039654593), np.float64(4.141404791637323),
np.float64(4.338614543620053), np.float64(4.535824295602782)] y_points
= [1.          +0.j
0.9992363989309585+0.02502863504008901j
0.9973227962519147+0.04428426199796687j
0.9935415909582272+0.07142429999402j
0.9894659852523793+0.08931832504565507j
0.9826671757340459+0.10994475392265546j
0.9756199658679523+0.13642239099134734j
0.9665211531296143+0.15266961373745924j
0.9570083398116758+0.17818124945374914j
0.9462995248193347+0.19577167408034368j
0.9331803064524291+0.2166465033051046j
0.9197850876991227+0.23654613116458356j
0.9059482683275757+0.2492237489132485j
0.8891030447442627+0.26692457369440326j
0.8732330225262315+0.2848277987589183j
0.8579426011196416+0.29715581601814245j
0.8399565759392063+0.31164583630417075j
0.8230653522914932+0.32379905331867476j
0.8045365263511368+0.3332750665850932j
0.7863113008358211+0.3400278760390265j
0.7649948709928194+0.3528802940324116j
0.7468432455805438+0.3607187050061871j
0.7269252176953047+0.3659075122705171j
0.7087459922443891+0.3721267209774093j ]
fit1: [ 0.3844370139873216 -0.29666309658146583]
[ 0.29738577297873126 -0.3388478341158775  0.3844097122140176
-0.04160391796771753] 7.033195659621701e-10
[ 0.29005971854298274 -0.3425014660183196  0.280070852684403
-0.05470756408444496 -0.00525419194186866] 6.928187849068392e-10
E_gs: -0.3425014660183196
test mps sampling took: (0.0012710094451904297, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.22509890833709603
1 Execution time: 0:01:32.456579 ovlp:
(0.9990671990671991+0.023612623612623507j)

```

```

2 Execution time: 0:01:32.458474  ovlp:
(0.9963567963567963+0.05210705210705213j)
3 Execution time: 0:01:32.461153  ovlp:
(0.9917367917367916+0.07910107910107911j)
4 Execution time: 0:01:32.464476  ovlp:
(0.9856383856383857+0.10256190256190245j)
5 Execution time: 0:01:32.468297  ovlp:
(0.978013178013178+0.12799392799392795j)
6 Execution time: 0:01:32.473483  ovlp:
(0.968130768130768+0.15566115566115557j)
7 Execution time: 0:01:32.479269  ovlp:
(0.9570251570251571+0.1753995753995754j)
8 Execution time: 0:01:32.485904  ovlp:
(0.9443267443267442+0.197949597949598j)
9 Execution time: 0:01:32.492831  ovlp:
(0.9297671297671297+0.2193996193996195j)
10 Execution time: 0:01:32.501778  ovlp:
(0.9156431156431157+0.24147884147884158j)
11 Execution time: 0:01:32.511418  ovlp:
(0.8976470976470976+0.2591360591360592j)
x_points = [np.float64(0.0), np.float64(0.22509890833709603),
np.float64(0.45019781667419206), np.float64(0.6752967250112881),
np.float64(0.9003956333483841), np.float64(1.1254945416854802),
np.float64(1.3505934500225762), np.float64(1.5756923583596723),
np.float64(1.8007912666967683), np.float64(2.0258901750338643),
np.float64(2.2509890833709605), np.float64(2.4760879917080563)]
y_points = [1.          +0.j
0.9990671990671991+0.02361262361262351j
0.9963567963567963+0.05210705210705213j
0.9917367917367916+0.07910107910107911j
0.9856383856383857+0.10256190256190245j
0.978013178013178 +0.12799392799392795j
0.968130768130768 +0.15566115566115557j
0.9570251570251571+0.1753995753995754j
0.9443267443267442+0.197949597949598j
0.9297671297671297+0.2193996193996195j
0.9156431156431157+0.24147884147884158j
0.8976470976470976+0.2591360591360592j ]
fit1: [ 0.3830469599939404 -0.3030773842255361]
[ 0.3830469599939404 -0.3030773842255361  0.3830569598939404
-0.          ] 8.907229090407201e-11
[ 2.9117889271567010e-01 -3.4437734825981503e-01
2.8505509240746374e-01
-5.9517261930457574e-02  2.7516564574907330e-06]
7.040417401962709e-11
E_gs: -0.34437734825981503
test mps sampling took: (0.001270294189453125, Counter({2: 5, 0: 5}))

```

truncated ham size: 12 Number of fitting points: 13

shots per matrix element: 416666.0

Total gate count: 224 2 qubit gates: 120

N gate: 224 dt: 0.2908952261077913

1 Execution time: 0:01:32.949483 ovlp:
(0.9986127977804764+0.031435250296400374j)

2 Execution time: 0:01:32.951363 ovlp:
(0.9944415911065458+0.0660145056232091j)

3 Execution time: 0:01:32.954456 ovlp:
(0.9868815790105263+0.10136656218649942j)

4 Execution time: 0:01:32.957982 ovlp:
(0.9764079622527395+0.13600821761314807j)

5 Execution time: 0:01:32.962317 ovlp:
(0.9631983411173457+0.16302266083625727j)

6 Execution time: 0:01:32.966925 ovlp:
(0.947655916249466+0.19270110832177334j)

7 Execution time: 0:01:32.972312 ovlp:
(0.9302318883710214+0.22083395333432532j)

8 Execution time: 0:01:32.978353 ovlp:
(0.9103118564989705+0.2471523954438326j)

9 Execution time: 0:01:32.985014 ovlp:
(0.8873774198038717+0.2707012331219729j)

10 Execution time: 0:01:32.992346 ovlp:
(0.8618749789999665+0.29379887007819216j)

11 Execution time: 0:01:33.000186 ovlp:
(0.837903740645985+0.3127685004296006j)

12 Execution time: 0:01:33.010031 ovlp:
(0.8102220963553541+0.3318917310267697j)

x_points = [np.float64(0.0), np.float64(0.2908952261077913),
np.float64(0.5817904522155826), np.float64(0.8726856783233738),
np.float64(1.1635809044311651), np.float64(1.4544761305389564),
np.float64(1.7453713566467477), np.float64(2.036266582754539),
np.float64(2.3271618088623303), np.float64(2.6180570349701213),
np.float64(2.908952261077913), np.float64(3.1998474871857043),
np.float64(3.4907427132934954)] y_points = [1. +0.j

0.9986127977804764+0.03143525029640037j

0.9944415911065458+0.0660145056232091j

0.9868815790105263+0.10136656218649942j

0.9764079622527395+0.13600821761314807j

0.9631983411173457+0.16302266083625727j

0.947655916249466 +0.19270110832177334j

0.9302318883710214+0.22083395333432532j

0.9103118564989705+0.2471523954438326j

0.8873774198038717+0.2707012331219729j

0.8618749789999665+0.29379887007819216j

0.837903740645985 +0.3127685004296006j

0.8102220963553541+0.3318917310267697j]

```

fit1: [ 0.3854688308675262 -0.2992177834833096]
[ 0.3854688308675262 -0.2992177834833096 0.3854788307675262
 -0.          ] 2.8187800280308994e-10
[ 2.9082383927197580e-01 -3.4121697364335879e-01
 3.0681072587810337e-01
 -5.7705043762637465e-02 2.0275248478916632e-06]
9.726951426922611e-11
E_gs: -0.3412169736433588
test mps sampling took: (0.0013279914855957031, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1823340002930397
1 Execution time: 0:01:33.419828 ovlp:
(0.9993879993879995+0.022269022269022276j)
2 Execution time: 0:01:33.421729 ovlp:
(0.9976179976179975+0.04393504393504388j)
3 Execution time: 0:01:33.424346 ovlp:
(0.9947199947199947+0.06354906354906364j)
4 Execution time: 0:01:33.427544 ovlp:
(0.9906699906699907+0.08382908382908383j)
5 Execution time: 0:01:33.431473 ovlp:
(0.9857439857439858+0.10538710538710538j)
6 Execution time: 0:01:33.436052 ovlp:
(0.9801039801039801+0.1254211254211255j)
7 Execution time: 0:01:33.441153 ovlp:
(0.9714639714639715+0.1462291462291463j)
8 Execution time: 0:01:33.447053 ovlp:
(0.9626919626919628+0.16510516510516515j)
9 Execution time: 0:01:33.453655 ovlp:
(0.9536739536739536+0.18151518151518142j)
10 Execution time: 0:01:33.461100 ovlp:
(0.9432459432459432+0.20326520326520336j)
11 Execution time: 0:01:33.469051 ovlp:
(0.9320979320979321+0.21768921768921778j)
12 Execution time: 0:01:33.477531 ovlp:
(0.9202899202899202+0.23373323373323363j)
13 Execution time: 0:01:33.486777 ovlp:
(0.9055599055599055+0.25137925137925143j)
14 Execution time: 0:01:33.498532 ovlp:
(0.8926478926478927+0.26450126450126454j)
15 Execution time: 0:01:33.509575 ovlp:
(0.875937875937876+0.27800127800127794j)
x_points = [np.float64(0.0), np.float64(0.1823340002930397),
np.float64(0.3646680005860794), np.float64(0.5470020008791191),
np.float64(0.7293360011721588), np.float64(0.9116700014651985),
np.float64(1.0940040017582382), np.float64(1.2763380020512778),

```

```

np.float64(1.4586720023443176), np.float64(1.6410060026373574),
np.float64(1.823340002930397), np.float64(2.0056740032234366),
np.float64(2.1880080035164764), np.float64(2.370342003809516),
np.float64(2.5526760041025556), np.float64(2.7350100043955954)]
y_points = [1.          +0.j
0.9993879993879995+0.02226902226902228j
0.9976179976179975+0.04393504393504388j
0.9947199947199947+0.06354906354906364j
0.9906699906699907+0.08382908382908383j
0.9857439857439858+0.10538710538710538j
0.9801039801039801+0.1254211254211255j
0.9714639714639715+0.1462291462291463j
0.9626919626919628+0.16510516510516515j
0.9536739536739536+0.18151518151518142j
0.9432459432459432+0.20326520326520336j
0.9320979320979321+0.21768921768921778j
0.9202899202899202+0.23373323373323363j
0.9055599055599055+0.25137925137925143j
0.8926478926478927+0.26450126450126454j
0.875937875937876 +0.27800127800127794j]
fit1: [ 0.3795199828690891 -0.3045855563109971]
[ 0.3795199828690891 -0.3045855563109971  0.3795299827690891
 -0.          ] 1.4284573607650598e-10
[ 2.9531652965787553e-01 -3.4305098942630857e-01
 2.9107529558575856e-01
 -5.2707376922454717e-02  2.3404451510536372e-06]
5.1669908718221176e-11
E_gs: -0.3430509894263086
test mps sampling took: (0.0012927055358886719, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.25116589955548824
1 Execution time: 0:01:34.010767 ovlp:
(0.9988619999999999+0.02930799999999989j)
2 Execution time: 0:01:34.012691 ovlp: (0.995552+0.057690000000000002j)
3 Execution time: 0:01:34.015274 ovlp:
(0.9899119999999999+0.08706199999999997j)
4 Execution time: 0:01:34.019089 ovlp:
(0.9825200000000001+0.11525199999999991j)
5 Execution time: 0:01:34.023368 ovlp: (0.972574+0.143424j)
x_points = [np.float64(0.0), np.float64(0.25116589955548824),
np.float64(0.5023317991109765), np.float64(0.7534976986664648),
np.float64(1.004663598221953), np.float64(1.2558294977774411)] y_points =
[1.          +0.j
0.9988619999999999+0.02930799999999989j
0.995552          +0.057690000000000002j

```

0.9899119999999999+0.08706199999999997j
0.9825200000000001+0.11525199999999991j
0.972574 +0.143424j]
fit1: [0.33027810514451206 -0.35442234082744023]
[0.33027810514451206 -0.35442234082744023 0.33028810504451206
-0.] 3.495154873002127e-10
[2.8021536632987387e-01 -3.0300276362118028e-01
2.7929437623470921e-01
-1.1587062232057102e-01 1.5582932022362721e-06]
2.6504044007668144e-10
E_gs: -0.3030027636211803
test mps sampling took: (0.0013000965118408203, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2601044548470871
1 Execution time: 0:01:34.636132 ovlp:
(0.9988543999999999+0.030988800000000004j)
2 Execution time: 0:01:34.638051 ovlp:
(0.9950015999999999+0.06066560000000001j)
3 Execution time: 0:01:34.640669 ovlp:
(0.9892160000000001+0.09044479999999999j)
4 Execution time: 0:01:34.644102 ovlp:
(0.9814592+0.12005759999999999j)
5 Execution time: 0:01:34.648010 ovlp:
(0.9706623999999999+0.1473279999999999j)
6 Execution time: 0:01:34.652459 ovlp: (0.957824+0.1744000000000001j)
7 Execution time: 0:01:34.657802 ovlp:
(0.942528+0.20213759999999992j)
8 Execution time: 0:01:34.663633 ovlp:
(0.925888+0.22324480000000002j)
9 Execution time: 0:01:34.670171 ovlp:
(0.9081216000000001+0.24682240000000001j)
10 Execution time: 0:01:34.677376 ovlp:
(0.8885183999999999+0.26920959999999994j)
11 Execution time: 0:01:34.685267 ovlp:
(0.8672447999999999+0.28705920000000007j)
12 Execution time: 0:01:34.693679 ovlp:
(0.8438464000000001+0.3107776j)
13 Execution time: 0:01:34.704365 ovlp:
(0.8225152+0.32362240000000001j)
14 Execution time: 0:01:34.715344 ovlp:
(0.7943423999999999+0.33868800000000001j)
15 Execution time: 0:01:34.727816 ovlp: (0.770464+0.3510848j)
16 Execution time: 0:01:34.739460 ovlp:
(0.7460224+0.36037760000000001j)
x_points = [np.float64(0.0), np.float64(0.2601044548470871),

```

np.float64(0.5202089096941742), np.float64(0.7803133645412613),
np.float64(1.0404178193883484), np.float64(1.3005222742354356),
np.float64(1.5606267290825226), np.float64(1.8207311839296096),
np.float64(2.080835638776697), np.float64(2.340940093623784),
np.float64(2.6010445484708713), np.float64(2.861149003317958),
np.float64(3.1212534581650453), np.float64(3.3813579130121325),
np.float64(3.6414623678592193), np.float64(3.9015668227063065),
np.float64(4.161671277553394)] y_points = [1.          +0.j
0.9988543999999999+0.030988800000000004j
0.9950015999999999+0.06066560000000001j
0.9892160000000001+0.09044479999999999j
0.9814592      +0.12005759999999999j
0.9706623999999999+0.14732799999999999j
0.957824      +0.17440000000000001j
0.942528      +0.20213759999999999j
0.925888      +0.22324480000000002j
0.9081216000000001+0.24682240000000001j
0.8885183999999999+0.26920959999999994j
0.8672447999999999+0.28705920000000007j
0.8438464000000001+0.3107776j
0.8225152      +0.32362240000000001j
0.7943423999999999+0.33868800000000001j
0.770464      +0.3510848j
0.7460224      +0.36037760000000001j ]
fit1: [ 0.384213142363926 -0.29733573740720237]
[ 3.8417170142252954e-01 -2.9729934842932715e-01
3.8422314226392601e-01
-1.3203397486995038e-04] 9.931786805160374e-10
[ 2.8694251991034792e-01 -3.4358922193889668e-01
3.0256844939768507e-01
-5.9743166419976033e-02 -2.1251104964668539e-05]
1.8575611724476968e-10
E_gs: -0.3435892219388967
test mps sampling took: (0.0013475418090820312, Counter({2: 8, 0: 2}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.24035573287910875
1 Execution time: 0:01:35.124596 ovlp:
(0.9990423967441489+0.028861098127733742j)
2 Execution time: 0:01:35.126481 ovlp:
(0.9957895856845913+0.05205637699168175j)
3 Execution time: 0:01:35.129009 ovlp:
(0.9907583685784531+0.08227407973187106j)
4 Execution time: 0:01:35.132282 ovlp:
(0.9837663448055722+0.1099837739448315j)
5 Execution time: 0:01:35.136085 ovlp:

```

```

(0.9748135143659489+0.13587706198201066j)
6 Execution time: 0:01:35.140652 ovlp:
(0.9648650805412737+0.1605163457555756j)
7 Execution time: 0:01:35.146928 ovlp:
(0.9511014337448747+0.18568003131210653j)
8 Execution time: 0:01:35.153715 ovlp:
(0.9374213872327166+0.21174811994360776j)
9 Execution time: 0:01:35.161079 ovlp:
(0.9211269318315682+0.22981338136549656j)
10 Execution time: 0:01:35.168577 ovlp:
(0.9035784721668054+0.2559194701261984j)
11 Execution time: 0:01:35.176656 ovlp:
(0.8829216019334465+0.27319432886071815j)
12 Execution time: 0:01:35.185573 ovlp:
(0.8658595439224492+0.2899599858639519j)
13 Execution time: 0:01:35.194982 ovlp:
(0.8444806712342823+0.3086180493013677j)
14 Execution time: 0:01:35.205043 ovlp:
(0.8210573915951314+0.3238561011107437j)
15 Execution time: 0:01:35.217433 ovlp:
(0.798530915005111+0.33695094563321515j)
16 Execution time: 0:01:35.229330 ovlp:
(0.7760880386993316+0.34677777904444884j)
17 Execution time: 0:01:35.241580 ovlp:
(0.7515475552616879+0.35779021648673615j)
18 Execution time: 0:01:35.254354 ovlp:
(0.728116675596697+0.36513944147410093j)
19 Execution time: 0:01:35.268004 ovlp:
(0.7025349886189614+0.3698210573915952j)
x_points = [np.float64(0.0), np.float64(0.24035573287910875),
np.float64(0.4807114657582175), np.float64(0.7210671986373263),
np.float64(0.961422931516435), np.float64(1.2017786643955437),
np.float64(1.4421343972746525), np.float64(1.6824901301537611),
np.float64(1.92284586303287), np.float64(2.163201595911979),
np.float64(2.4035573287910874), np.float64(2.643913061670196),
np.float64(2.884268794549305), np.float64(3.1246245274284137),
np.float64(3.3649802603075223), np.float64(3.6053359931866313),
np.float64(3.84569172606574), np.float64(4.086047458944849),
np.float64(4.326403191823958), np.float64(4.566758924703066)] y_points =
[1.          +0.j
0.9990423967441489+0.02886109812773374j
0.9957895856845913+0.05205637699168175j
0.9907583685784531+0.08227407973187106j
0.9837663448055722+0.1099837739448315j
0.9748135143659489+0.13587706198201066j
0.9648650805412737+0.1605163457555756j
0.9511014337448747+0.18568003131210653j

```



```

0.9374213872327166+0.21174811994360776j
0.9211269318315682+0.22981338136549656j
0.9035784721668054+0.2559194701261984j
0.8829216019334465+0.27319432886071815j
0.8658595439224492+0.2899599858639519j
0.8444806712342823+0.3086180493013677j
0.8210573915951314+0.3238561011107437j
0.798530915005111 +0.33695094563321515j
0.7760880386993316+0.34677777904444884j
0.7515475552616879+0.35779021648673615j
0.728116675596697 +0.36513944147410093j
0.7025349886189614+0.3698210573915952j ]
fit1: [ 0.38164149165167166 -0.29819579729137247]
[ 0.34916285149967075 -0.3130074122686336  0.3816209913250731
-0.01506854651660171] 5.629599788693907e-10
[ 0.30574713797570363 -0.3342733709914    0.28714677800966376
-0.04760454129522513 -0.00095887543641029] 2.2025759578701426e-10
E_gs: -0.3342733709914
test mps sampling took: (0.0013246536254882812, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1138756539375016
1 Execution time: 0:01:35.855861 ovlp:
(0.99979400000000001+0.012523999999999998j)
2 Execution time: 0:01:35.857937 ovlp:
(0.99907600000000001+0.025091999999999989j)
3 Execution time: 0:01:35.860856 ovlp:
(0.9979439999999999+0.03922599999999998j)
4 Execution time: 0:01:35.864504 ovlp:
(0.996278+0.052742000000000007j)
5 Execution time: 0:01:35.868315 ovlp:
(0.994078+0.06697799999999998j)
x_points = [np.float64(0.0), np.float64(0.1138756539375016),
np.float64(0.2277513078750032), np.float64(0.3416269618125048),
np.float64(0.4555026157500064), np.float64(0.569378269687508)] y_points
= [1.          +0.j
0.99979400000000001+0.012523999999999998j
0.99907600000000001+0.025091999999999989j
0.9979439999999999+0.03922599999999998j
0.996278          +0.052742000000000007j
0.994078          +0.06697799999999998j]
fit1: [ 0.49062195593106656 -0.24474069375913374]
[ 0.49062195593106656 -0.24474069375913374  0.49063195583106656
-0.          ] 2.973011903809078e-11
[ 4.1694071233113095e-01 -2.0770479293537286e-01
4.1724991125784444e-01

```

```

-8.1532830945760887e-02 1.4918998539712993e-06]
9.369885864270134e-11
E_gs: -0.20770479293537286
test mps sampling took: (0.001317739486694336, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.15342025557999753
1 Execution time: 0:01:36.381900 ovlp:
(0.9995995995995997+0.01614341614341619j)
2 Execution time: 0:01:36.383878 ovlp:
(0.9982787982787982+0.0382070382070383j)
3 Execution time: 0:01:36.387252 ovlp:
(0.9961675961675962+0.052735852735852795j)
4 Execution time: 0:01:36.392019 ovlp:
(0.9933023933023932+0.07153387153387158j)
5 Execution time: 0:01:36.397234 ovlp:
(0.9892723892723894+0.08817388817388827j)
6 Execution time: 0:01:36.402479 ovlp:
(0.9853099853099854+0.10534430534430528j)
7 Execution time: 0:01:36.409399 ovlp:
(0.9798915798915799+0.12358592358592357j)
8 Execution time: 0:01:36.415746 ovlp:
(0.973927173927174+0.1368563368563369j)
9 Execution time: 0:01:36.423439 ovlp:
(0.9665691665691665+0.15685555685555697j)
10 Execution time: 0:01:36.432806 ovlp:
(0.9592839592839593+0.1695695695695696j)
11 Execution time: 0:01:36.442792 ovlp:
(0.9516451516451516+0.18517478517478514j)
12 Execution time: 0:01:36.452396 ovlp:
(0.9417287417287417+0.20667160667160678j)
13 Execution time: 0:01:36.462830 ovlp:
(0.9327847327847327+0.2147420147420147j)
x_points = [np.float64(0.0), np.float64(0.15342025557999753),
np.float64(0.30684051115999506), np.float64(0.4602607667399926),
np.float64(0.6136810223199901), np.float64(0.7671012778999876),
np.float64(0.9205215334799852), np.float64(1.0739417890599827),
np.float64(1.2273620446399802), np.float64(1.3807823002199777),
np.float64(1.5342025557999752), np.float64(1.6876228113799727),
np.float64(1.8410430669599704), np.float64(1.994463322539968)] y_points
= [1.          +0.j
0.9995995995995997+0.01614341614341619j
0.9982787982787982+0.0382070382070383j
0.9961675961675962+0.0527358527358528j
0.9933023933023932+0.07153387153387158j
0.9892723892723894+0.08817388817388827j

```

0.9853099853099854+0.10534430534430528j
0.9798915798915799+0.12358592358592357j
0.973927173927174 +0.1368563368563369j
0.9665691665691665+0.15685555685555697j
0.9592839592839593+0.1695695695695696j
0.9516451516451516+0.18517478517478514j
0.9417287417287417+0.20667160667160678j
0.9327847327847327+0.2147420147420147j]
fit1: [0.3815447485539957 -0.30422286858919245]
[0.3815447485539957 -0.30422286858919245 0.38155474845399573
-0.] 2.339480801274096e-10
[2.6606619574818546e-01 -3.5676207681608668e-01
2.8869170538895350e-01
-7.6345826588582508e-02 5.0369185332248748e-06]
2.486854790272231e-10
E_gs: -0.3567620768160867
test mps sampling took: (0.001354217529296875, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.09470155418514453
1 Execution time: 0:01:36.902704 ovlp:
(0.9998527997939197+0.012801817922545089j)
2 Execution time: 0:01:36.904633 ovlp:
(0.9993467990855187+0.02170743039040257j)
3 Execution time: 0:01:36.907381 ovlp:
(0.9984359978103969+0.034256247958747155j)
4 Execution time: 0:01:36.912341 ovlp:
(0.9975619965867952+0.04138625794076112j)
5 Execution time: 0:01:36.917229 ovlp:
(0.9960715945002323+0.053171474440064204j)
6 Execution time: 0:01:36.923468 ovlp:
(0.993900391460548+0.06292348809288328j)
7 Execution time: 0:01:36.930433 ovlp:
(0.9921431890004646+0.08055991278387786j)
8 Execution time: 0:01:36.937115 ovlp:
(0.9897879857031799+0.08628232079524922j)
9 Execution time: 0:01:36.945160 ovlp:
(0.9875155825218156+0.09594233431926802j)
10 Execution time: 0:01:36.955813 ovlp:
(0.9845531783744497+0.10958595342033473j)
11 Execution time: 0:01:36.966024 ovlp:
(0.9808271731580425+0.12019356827099559j)
12 Execution time: 0:01:36.975407 ovlp:
(0.9778371689720367+0.13219038506653913j)
13 Execution time: 0:01:36.985762 ovlp:
(0.9737339632275486+0.13952279533191336j)

```

14 Execution time: 0:01:36.998765  ovlp:
(0.9691615568261795+0.1545740164036229j)
15 Execution time: 0:01:37.011325  ovlp:
(0.964745550643771+0.16192482669475727j)
16 Execution time: 0:01:37.023232  ovlp:
(0.9603387444742422+0.17067403894365452j)
17 Execution time: 0:01:37.035571  ovlp:
(0.9551039371455119+0.18221085509519708j)
18 Execution time: 0:01:37.050661  ovlp:
(0.9509363313108639+0.18576206006688412j)
19 Execution time: 0:01:37.066458  ovlp:
(0.9449655229517322+0.1945756724059413j)
20 Execution time: 0:01:37.083815  ovlp:
(0.9383783137296393+0.20863329208660897j)
21 Execution time: 0:01:37.099651  ovlp:
(0.9335207069289897+0.21344489882285833j)
22 Execution time: 0:01:37.117158  ovlp:
(0.9278258989562584+0.22683091756328455j)
23 Execution time: 0:01:37.136191  ovlp:
(0.9207694890772846+0.22939772115680968j)
x_points = [np.float64(0.0), np.float64(0.09470155418514453),
np.float64(0.18940310837028906), np.float64(0.2841046625554336),
np.float64(0.3788062167405781), np.float64(0.47350777092572266),
np.float64(0.5682093251108672), np.float64(0.6629108792960117),
np.float64(0.7576124334811563), np.float64(0.8523139876663008),
np.float64(0.9470155418514453), np.float64(1.0417170960365898),
np.float64(1.1364186502217344), np.float64(1.231120204406879),
np.float64(1.3258217585920233), np.float64(1.420523312777168),
np.float64(1.5152248669623125), np.float64(1.609926421147457),
np.float64(1.7046279753326017), np.float64(1.799329529517746),
np.float64(1.8940310837028906), np.float64(1.9887326378880352),
np.float64(2.0834341920731796), np.float64(2.178135746258324)] y_points =
[1.          +0.j
0.9998527997939197+0.01280181792254509j
0.9993467990855187+0.02170743039040257j
0.9984359978103969+0.03425624795874715j
0.9975619965867952+0.04138625794076112j
0.9960715945002323+0.0531714744400642j
0.993900391460548 +0.06292348809288328j
0.9921431890004646+0.08055991278387786j
0.9897879857031799+0.08628232079524922j
0.9875155825218156+0.09594233431926802j
0.9845531783744497+0.10958595342033473j
0.9808271731580425+0.12019356827099559j
0.9778371689720367+0.13219038506653913j
0.9737339632275486+0.13952279533191336j
0.9691615568261795+0.1545740164036229j

```

0.964745550643771 +0.16192482669475727j
 0.9603387444742422+0.17067403894365452j
 0.9551039371455119+0.18221085509519708j
 0.9509363313108639+0.18576206006688412j
 0.9449655229517322+0.1945756724059413j
 0.9383783137296393+0.20863329208660897j
 0.9335207069289897+0.21344489882285833j
 0.9278258989562584+0.22683091756328455j
 0.9207694890772846+0.22939772115680968j]

fit1: [0.38435060834380597 -0.3009391087033302]
 [0.38435060834380597 -0.3009391087033302 0.38436060824380597
 -0.] 1.2330620908877206e-09
 [2.8649303935301201e-01 -3.4648681778390278e-01
 3.0328223798316029e-01
 -5.6397609402005215e-02 3.6947579965588913e-06]
 8.906289398874447e-10
 E_gs: -0.3464868177839028
 test mps sampling took: (0.0013546943664550781, Counter({0: 7, 2: 3}))
 truncated ham size: 12 Number of fitting points: 24
 shots per matrix element: 217391.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.18547566983603297

- 1 Execution time: 0:01:37.577434 ovlp:
(0.9994111991756789+0.025396635555289704j)
- 2 Execution time: 0:01:37.580340 ovlp:
(0.9975343965481551+0.04144145801804133j)
- 3 Execution time: 0:01:37.584009 ovlp:
(0.9947651926712697+0.0646162904628067j)
- 4 Execution time: 0:01:37.588137 ovlp:
(0.9904687866563013+0.08459871843820577j)
- 5 Execution time: 0:01:37.593096 ovlp:
(0.9845623783873299+0.10967795354913501j)
- 6 Execution time: 0:01:37.597855 ovlp:
(0.9783247696546775+0.12662437727412823j)
- 7 Execution time: 0:01:37.604506 ovlp:
(0.9705139587195422+0.14854800796721124j)
- 8 Execution time: 0:01:37.611249 ovlp:
(0.9608815452341632+0.16538403153764425j)
- 9 Execution time: 0:01:37.619292 ovlp:
(0.9522243331140663+0.18780446292624808j)
- 10 Execution time: 0:01:37.629290 ovlp:
(0.9412395177353248+0.20085008119011372j)
- 11 Execution time: 0:01:37.638377 ovlp:
(0.9286447001025802+0.2218445105823148j)
- 12 Execution time: 0:01:37.647314 ovlp:
(0.9173930843503182+0.24156933819707338j)
- 13 Execution time: 0:01:37.656722 ovlp:

```

(0.9031974644764502+0.2555257577360608j)
14 Execution time: 0:01:37.668789 ovlp:
(0.8891398447957828+0.2703285784600098j)
15 Execution time: 0:01:37.679975 ovlp:
(0.87250622150871+0.2857202000082799j)
16 Execution time: 0:01:37.693315 ovlp:
(0.8575838006173209+0.2956470139058194j)
17 Execution time: 0:01:37.707924 ovlp:
(0.8405453767635274+0.30884903238864525j)
18 Execution time: 0:01:37.721648 ovlp:
(0.8222373511322916+0.3196498475097864j)
19 Execution time: 0:01:37.736550 ovlp:
(0.8066985293779412+0.3347470686458962j)
20 Execution time: 0:01:37.753400 ovlp:
(0.7903869065416691+0.3440114816160742j)
21 Execution time: 0:01:37.769693 ovlp:
(0.7706712789397905+0.3502582903616065j)
22 Execution time: 0:01:37.787187 ovlp:
(0.7517008523811934+0.3562658987722582j)
23 Execution time: 0:01:37.804897 ovlp:
(0.7343496280894792+0.36226430717003j)
x_points = [np.float64(0.0), np.float64(0.18547566983603297),
np.float64(0.37095133967206595), np.float64(0.556427009508099),
np.float64(0.7419026793441319), np.float64(0.9273783491801648),
np.float64(1.112854019016198), np.float64(1.2983296888522309),
np.float64(1.4838053586882638), np.float64(1.6692810285242967),
np.float64(1.8547566983603296), np.float64(2.0402323681963628),
np.float64(2.225708038032396), np.float64(2.4111837078684286),
np.float64(2.5966593777044618), np.float64(2.7821350475404945),
np.float64(2.9676107173765276), np.float64(3.1530863872125607),
np.float64(3.3385620570485934), np.float64(3.5240377268846266),
np.float64(3.7095133967206593), np.float64(3.8949890665566924),
np.float64(4.0804647363927256), np.float64(4.265940406228759)] y_points
= [1.          +0.j
0.9994111991756789+0.0253966355552897j
0.9975343965481551+0.04144145801804133j
0.9947651926712697+0.0646162904628067j
0.9904687866563013+0.08459871843820577j
0.9845623783873299+0.10967795354913501j
0.9783247696546775+0.12662437727412823j
0.9705139587195422+0.14854800796721124j
0.9608815452341632+0.16538403153764425j
0.9522243331140663+0.18780446292624808j
0.9412395177353248+0.20085008119011372j
0.9286447001025802+0.2218445105823148j
0.9173930843503182+0.24156933819707338j
0.9031974644764502+0.2555257577360608j

```

```

0.8891398447957828+0.2703285784600098j
0.87250622150871 +0.2857202000082799j
0.8575838006173209+0.2956470139058194j
0.8405453767635274+0.30884903238864525j
0.8222373511322916+0.3196498475097864j
0.8066985293779412+0.3347470686458962j
0.7903869065416691+0.3440114816160742j
0.7706712789397905+0.3502582903616065j
0.7517008523811934+0.3562658987722582j
0.7343496280894792+0.36226430717003j ]
fit1: [ 0.3828542123482386 -0.2986019401383045]
[ 0.32431996479886493 -0.3260514802657822  0.379695423320825
-0.02742416202896366] 5.365788166367931e-10
[ 0.2696457669315289 -0.3550528108660846  0.28809182022194224
-0.06595272677383002 -0.00608396068774987] 5.354971841517337e-10
E_gs: -0.3550528108660846
test mps sampling took: (0.0014111995697021484, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2884935625217749
1 Execution time: 0:01:38.201298 ovlp:
(0.9984399993759998+0.03358681343472547j)
2 Execution time: 0:01:38.203320 ovlp:
(0.9941199976479991+0.06733082693233072j)
3 Execution time: 0:01:38.206165 ovlp:
(0.9865863946345579+0.10099564039825615j)
4 Execution time: 0:01:38.209499 ovlp:
(0.9763095905238361+0.13126925250770105j)
5 Execution time: 0:01:38.213426 ovlp:
(0.9637263854905542+0.1613892645557058j)
6 Execution time: 0:01:38.218866 ovlp:
(0.9483735793494317+0.19164127665651076j)
x_points = [np.float64(0.0), np.float64(0.2884935625217749),
np.float64(0.5769871250435498), np.float64(0.8654806875653247),
np.float64(1.1539742500870995), np.float64(1.4424678126088744),
np.float64(1.7309613751306494)] y_points = [1.          +0.j
0.9984399993759998+0.03358681343472547j
0.9941199976479991+0.06733082693233072j
0.9865863946345579+0.10099564039825615j
0.9763095905238361+0.13126925250770105j
0.9637263854905542+0.1613892645557058j
0.9483735793494317+0.19164127665651076j]
fit1: [ 0.39583780214275566 -0.29468447710496654]
[ 0.39583780214275566 -0.29468447710496654  0.39584780204275566
-0.          ] 2.162629447479425e-11
[ 2.930038327078066e-01 -3.338399261852286e-01

```

3.029337482806596e-01
 -6.278925230446260e-02 5.634361002224030e-06]
 4.480166638500148e-11
 E_gs: -0.3338399261852286
 test mps sampling took: (0.0013082027435302734, Counter({0: 5, 2: 5}))
 truncated ham size: 12 Number of fitting points: 11
 shots per matrix element: 500000.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.19159329704620096
 1 Execution time: 0:01:38.761455 ovlp:
 (0.9993000000000001+0.021532000000000107j)
 2 Execution time: 0:01:38.763394 ovlp: (0.997504+0.045296j)
 3 Execution time: 0:01:38.765924 ovlp:
 (0.994232+0.06555599999999995j)
 4 Execution time: 0:01:38.769682 ovlp:
 (0.989932+0.08684399999999992j)
 5 Execution time: 0:01:38.774052 ovlp:
 (0.9837959999999999+0.10973199999999994j)
 6 Execution time: 0:01:38.779528 ovlp:
 (0.9769000000000001+0.1299999999999999j)
 7 Execution time: 0:01:38.785371 ovlp: (0.969408+0.152412j)
 8 Execution time: 0:01:38.791447 ovlp: (0.959328+0.17244799999999993j)
 9 Execution time: 0:01:38.798379 ovlp:
 (0.948412+0.19044799999999995j)
 10 Execution time: 0:01:38.805857 ovlp: (0.9371719999999999+0.209252j)
 x_points = [np.float64(0.0), np.float64(0.19159329704620096),
 np.float64(0.3831865940924019), np.float64(0.5747798911386028),
 np.float64(0.7663731881848038), np.float64(0.9579664852310048),
 np.float64(1.1495597822772057), np.float64(1.3411530793234068),
 np.float64(1.5327463763696076), np.float64(1.7243396734158085),
 np.float64(1.9159329704620096)] y_points = [1. +0.j
 0.9993000000000001+0.02153200000000011j
 0.997504 +0.045296j
 0.994232 +0.06555599999999995j
 0.989932 +0.08684399999999992j
 0.9837959999999999+0.10973199999999994j
 0.9769000000000001+0.1299999999999999j
 0.969408 +0.152412j
 0.959328 +0.17244799999999993j
 0.948412 +0.19044799999999995j
 0.9371719999999999+0.209252j]
 fit1: [0.39051385369266695 -0.2964402273284236]
 [0.39051385369266695 -0.2964402273284236 0.39052385359266695
 -0.] 1.470115071628901e-11
 [2.8770423865795675e-01 -3.4285181921272340e-01
 2.9592761219694058e-01
 -5.9776517089349009e-02 6.4074538780851537e-06]


```

6.721363256362435e-12
E_gs: -0.3428518192127234
test mps sampling took: (0.0012938976287841797, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1750957112402922
1 Execution time: 0:01:39.345714 ovlp:
(0.9994023983267153+0.022611663312657182j)
2 Execution time: 0:01:39.347605 ovlp:
(0.9977463936899023+0.041173315285282897j)
3 Execution time: 0:01:39.350159 ovlp:
(0.9951615864524421+0.06207497380992666j)
4 Execution time: 0:01:39.353973 ovlp:
(0.9916119765135343+0.0822206302177646j)
5 Execution time: 0:01:39.358225 ovlp:
(0.9867447628853361+0.10000468001310403j)
6 Execution time: 0:01:39.363701 ovlp:
(0.9805023454065671+0.12180634105775501j)
7 Execution time: 0:01:39.370213 ovlp:
(0.9737559265165943+0.13691198335355348j)
8 Execution time: 0:01:39.376898 ovlp:
(0.9659799047437332+0.15837524345068177j)
9 Execution time: 0:01:39.383874 ovlp:
(0.9566774786969403+0.1752520907058539j)
10 Execution time: 0:01:39.391179 ovlp:
(0.9465830504325412+0.19383534273895964j)
11 Execution time: 0:01:39.399285 ovlp:
(0.9363446217649409+0.21274979569942798j)
12 Execution time: 0:01:39.408142 ovlp:
(0.9251125903152528+0.22777623777346578j)
13 Execution time: 0:01:39.418664 ovlp:
(0.9123397545513128+0.23725866432426002j)
14 Execution time: 0:01:39.428796 ovlp:
(0.9003013208436983+0.2566051184943319j)
15 Execution time: 0:01:39.439598 ovlp:
(0.8850948782656591+0.27376276653574627j)
16 Execution time: 0:01:39.453447 ovlp:
(0.8715228402639528+0.2824171907681341j)
17 Execution time: 0:01:39.467540 ovlp:
(0.857403600730082+0.3002876408053943j)
18 Execution time: 0:01:39.480626 ovlp:
(0.8435075618211731+0.3087764645741009j)
x_points = [np.float64(0.0), np.float64(0.1750957112402922),
np.float64(0.3501914224805844), np.float64(0.5252871337208765),
np.float64(0.7003828449611688), np.float64(0.875478556201461),
np.float64(1.050574267441753), np.float64(1.2256699786820453),

```

```

np.float64(1.4007656899223375), np.float64(1.5758614011626297),
np.float64(1.750957112402922), np.float64(1.9260528236432142),
np.float64(2.101148534883506), np.float64(2.2762442461237984),
np.float64(2.4513399573640906), np.float64(2.626435668604383),
np.float64(2.801531379844675), np.float64(2.9766270910849673),
np.float64(3.1517228023252595)] y_points = [1.          +0.j
0.9994023983267153+0.02261166331265718j
0.9977463936899023+0.0411733152852829j
0.9951615864524421+0.06207497380992666j
0.9916119765135343+0.0822206302177646j
0.9867447628853361+0.10000468001310403j
0.9805023454065671+0.12180634105775501j
0.9737559265165943+0.13691198335355348j
0.9659799047437332+0.15837524345068177j
0.9566774786969403+0.1752520907058539j
0.9465830504325412+0.19383534273895964j
0.9363446217649409+0.21274979569942798j
0.9251125903152528+0.22777623777346578j
0.9123397545513128+0.23725866432426002j
0.9003013208436983+0.2566051184943319j
0.8850948782656591+0.27376276653574627j
0.8715228402639528+0.2824171907681341j
0.857403600730082 +0.3002876408053943j
0.8435075618211731+0.3087764645741009j ]
fit1: [ 0.3808463680080469 -0.3018921335942857]
[ 0.3808463680080469 -0.3018921335942857 0.3808563679080469
-0.          ] 5.797515365334234e-10
[ 2.8415055015030349e-01 -3.4672029871008414e-01
3.0345302373458988e-01
-5.8681570122791238e-02 8.8763364227195734e-06]
5.117098755798301e-10
E_gs: -0.34672029871008414
test mps sampling took: (0.0013189315795898438, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.03901528683521308
1 Execution time: 0:01:39.986045 ovlp: (1+0.004437009761421473j)
2 Execution time: 0:01:39.987954 ovlp:
(0.9998911997606394+0.010359822791610185j)
3 Execution time: 0:01:39.991094 ovlp:
(0.9997551994614389+0.01152942536473578j)
4 Execution time: 0:01:39.994567 ovlp:
(0.9995239989527978+0.014378631632989691j)
5 Execution time: 0:01:39.998984 ovlp:
(0.9993131984890367+0.02384425245735544j)
6 Execution time: 0:01:40.003616 ovlp:

```

```

(0.998973197741035+0.027706660954654128j)
7 Execution time: 0:01:40.009075  ovlp:
(0.998578796873353+0.03156226943699281j)
8 Execution time: 0:01:40.015526  ovlp:
(0.9982047960505513+0.03670308074677764j)
9 Execution time: 0:01:40.023174  ovlp:
(0.9978647953025497+0.041435891158960514j)
10 Execution time: 0:01:40.031633  ovlp:
(0.9974159943151875+0.04280269416592719j)
11 Execution time: 0:01:40.039863  ovlp:
(0.9968379930435847+0.04915390813859788j)
12 Execution time: 0:01:40.049350  ovlp:
(0.9963619919963824+0.056824325013514976j)
13 Execution time: 0:01:40.058897  ovlp:
(0.9950087890193358+0.058925529636165264j)
14 Execution time: 0:01:40.069811  ovlp:
(0.9950087890193358+0.060992734184015296j)
15 Execution time: 0:01:40.080949  ovlp:
(0.9941315870894916+0.0659703451347593j)
16 Execution time: 0:01:40.094742  ovlp:
(0.9931659849651668+0.07193395825470805j)
17 Execution time: 0:01:40.109095  ovlp:
(0.9922343829156424+0.07489876477728252j)
x_points = [np.float64(0.0), np.float64(0.03901528683521308),
np.float64(0.07803057367042616), np.float64(0.11704586050563925),
np.float64(0.15606114734085233), np.float64(0.1950764341760654),
np.float64(0.2340917210112785), np.float64(0.27310700784649156),
np.float64(0.31212229468170466), np.float64(0.35113758151691776),
np.float64(0.3901528683521308), np.float64(0.4291681551873439),
np.float64(0.468183442022557), np.float64(0.5071987288577701),
np.float64(0.5462140156929831), np.float64(0.5852293025281963),
np.float64(0.6242445893634093), np.float64(0.6632598761986224)]
y_points = [1.          +0.j
1.          +0.00443700976142147j
0.9998911997606394+0.01035982279161018j
0.9997551994614389+0.01152942536473578j
0.9995239989527978+0.01437863163298969j
0.9993131984890367+0.02384425245735544j
0.998973197741035 +0.02770666095465413j
0.998578796873353 +0.03156226943699281j
0.9982047960505513+0.03670308074677764j
0.9978647953025497+0.04143589115896051j
0.9974159943151875+0.04280269416592719j
0.9968379930435847+0.04915390813859788j
0.9963619919963824+0.05682432501351498j
0.9950087890193358+0.05892552963616526j
0.9950087890193358+0.0609927341840153j

```

0.9941315870894916+0.0659703451347593j
0.9931659849651668+0.07193395825470805j
0.9922343829156424+0.07489876477728252j]
fit1: [0.4441698430072181 -0.2587644306558572]
[0.4441698430072181 -0.2587644306558572 0.4441798429072181
-0.] 1.618565569969709e-10
[3.5479937647975068e-01 -2.5966272713773986e-01
3.6890948886478009e-01
-6.3208204507185992e-02 2.6912546877790357e-06]
2.1018404453781334e-10
E_gs: -0.25966272713773986
test mps sampling took: (0.0013034343719482422, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.029967803626688286
1 Execution time: 0:01:40.686064 ovlp:
(0.9999823999436799+0.007462423879756486j)
2 Execution time: 0:01:40.688029 ovlp:
(0.9999295997747193+0.0090376289204126j)
3 Execution time: 0:01:40.690686 ovlp:
(0.9998591995494386+0.011448836636277271j)
4 Execution time: 0:01:40.694056 ovlp:
(0.9997711992678378+0.011836037875321281j)
5 Execution time: 0:01:40.697950 ovlp:
(0.9994631982822344+0.01430004576014654j)
6 Execution time: 0:01:40.702523 ovlp:
(0.999322397831673+0.01831285860114762j)
7 Execution time: 0:01:40.708808 ovlp:
(0.9991815973811116+0.023381674821359333j)
8 Execution time: 0:01:40.716011 ovlp:
(0.9989087965081489+0.02783448907036501j)
9 Execution time: 0:01:40.723724 ovlp:
(0.9987415959731072+0.03194410222112709j)
10 Execution time: 0:01:40.731267 ovlp:
(0.9986095955507057+0.037479319933823696j)
11 Execution time: 0:01:40.739184 ovlp:
(0.9982751944806223+0.03466331092259489j)
12 Execution time: 0:01:40.748941 ovlp:
(0.997755992819177+0.04203773452075055j)
13 Execution time: 0:01:40.759894 ovlp:
(0.9973951916646133+0.04652574888239647j)
14 Execution time: 0:01:40.770065 ovlp:
(0.9970519905663697+0.04965855890738857j)
15 Execution time: 0:01:40.783132 ovlp:
(0.9964183885388433+0.055334577070646596j)
16 Execution time: 0:01:40.796007 ovlp:

```
(0.9958463867084375+0.056865781970502294j)
17 Execution time: 0:01:40.809893  ovlp:
(0.9958639867647576+0.05808018585659469j)
18 Execution time: 0:01:40.823452  ovlp:
(0.9952215847090711+0.061591397092470634j)
19 Execution time: 0:01:40.837781  ovlp:
(0.9941655813298602+0.06644021260868027j)
20 Execution time: 0:01:40.854190  ovlp:
(0.9937871801189764+0.07098102713928678j)
21 Execution time: 0:01:40.870524  ovlp:
(0.9930303776972087+0.07017142454855851j)
22 Execution time: 0:01:40.888395  ovlp:
(0.9924583758668029+0.07390263648843676j)
x_points = [np.float64(0.0), np.float64(0.029967803626688286),
np.float64(0.05993560725337657), np.float64(0.08990341088006486),
np.float64(0.11987121450675314), np.float64(0.14983901813344142),
np.float64(0.17980682176012971), np.float64(0.20977462538681801),
np.float64(0.2397424290135063), np.float64(0.26971023264019456),
np.float64(0.29967803626688283), np.float64(0.32964583989357116),
np.float64(0.35961364352025943), np.float64(0.3895814471469477),
np.float64(0.41954925077363603), np.float64(0.4495170544003243),
np.float64(0.4794848580270126), np.float64(0.5094526616537008),
np.float64(0.5394204652803891), np.float64(0.5693882689070774),
np.float64(0.5993560725337657), np.float64(0.629323876160454),
np.float64(0.6592916797871423)] y_points = [1.          +0.j
0.9999823999436799+0.00746242387975649j
0.9999295997747193+0.0090376289204126j
0.9998591995494386+0.01144883663627727j
0.9997711992678378+0.01183603787532128j
0.9994631982822344+0.01430004576014654j
0.999322397831673 +0.01831285860114762j
0.9991815973811116+0.02338167482135933j
0.9989087965081489+0.02783448907036501j
0.9987415959731072+0.03194410222112709j
0.9986095955507057+0.0374793199338237j
0.9982751944806223+0.03466331092259489j
0.997755992819177 +0.04203773452075055j
0.9973951916646133+0.04652574888239647j
0.9970519905663697+0.04965855890738857j
0.9964183885388433+0.0553345770706466j
0.9958463867084375+0.05686578197050229j
0.9958639867647576+0.05808018585659469j
0.9952215847090711+0.06159139709247063j
0.9941655813298602+0.06644021260868027j
0.9937871801189764+0.07098102713928678j
0.9930303776972087+0.07017142454855851j
0.9924583758668029+0.07390263648843676j]
```

```
fit1: [ 0.36156483472990186 -0.32111163314349556]
[ 0.36156483472990186 -0.32111163314349556 0.36157483462990186
-0.          ] 4.2260661619160327e-10
[ 2.5425088373062299e-01 -3.4733107356651588e-01
2.9614632094787557e-01
-9.3933068659825966e-02 3.5041003963226033e-06]
4.2090864102741497e-10
E_gs: -0.3473310735665159
test mps sampling took: (0.0013175010681152344, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.27352843347171674
1 Execution time: 0:01:41.534287 ovlp:
(0.9987071999999999+0.031257599999999996j)
2 Execution time: 0:01:41.536238 ovlp:
(0.9946176+0.064115200000000004j)
3 Execution time: 0:01:41.538853 ovlp:
(0.9881856+0.094771200000000006j)
4 Execution time: 0:01:41.542173 ovlp:
(0.9793023999999999+0.12624640000000001j)
5 Execution time: 0:01:41.546003 ovlp:
(0.9674240000000001+0.15605760000000002j)
6 Execution time: 0:01:41.550471 ovlp:
(0.9531712000000001+0.18407039999999997j)
7 Execution time: 0:01:41.555608 ovlp:
(0.9365695999999999+0.20761600000000002j)
8 Execution time: 0:01:41.562457 ovlp: (0.9198527999999999+0.2373824j)
9 Execution time: 0:01:41.569525 ovlp:
(0.8998463999999999+0.2613824j)
10 Execution time: 0:01:41.576862 ovlp:
(0.8753088+0.28134400000000004j)
11 Execution time: 0:01:41.584872 ovlp:
(0.8539456000000001+0.3020288j)
12 Execution time: 0:01:41.594984 ovlp:
(0.8294976000000001+0.3188544j)
13 Execution time: 0:01:41.605863 ovlp: (0.803968+0.3357888j)
14 Execution time: 0:01:41.617181 ovlp:
(0.7773504+0.35116159999999996j)
15 Execution time: 0:01:41.629141 ovlp:
(0.7488767999999999+0.35800319999999997j)
16 Execution time: 0:01:41.642685 ovlp:
(0.7223295999999999+0.36451199999999995j)
x_points = [np.float64(0.0), np.float64(0.27352843347171674),
np.float64(0.5470568669434335), np.float64(0.8205853004151502),
np.float64(1.094113733886867), np.float64(1.3676421673585837),
np.float64(1.6411706008303004), np.float64(1.9146990343020172),
```

```

np.float64(2.188227467773734), np.float64(2.461755901245451),
np.float64(2.7352843347171674), np.float64(3.008812768188884),
np.float64(3.282341201660601), np.float64(3.555869635132318),
np.float64(3.8293980686040343), np.float64(4.102926502075751),
np.float64(4.376454935547468)] y_points = [1.          +0.j
0.9987071999999999+0.0312576j
0.9946176      +0.064115200000000004j
0.9881856      +0.094771200000000006j
0.9793023999999999+0.12624640000000001j
0.9674240000000001+0.156057600000000002j
0.9531712000000001+0.18407039999999997j
0.9365695999999999+0.207616000000000002j
0.9198527999999999+0.2373824j
0.8998463999999999+0.2613824j
0.8753088      +0.281344000000000004j
0.8539456000000001+0.3020288j
0.8294976000000001+0.3188544j
0.803968      +0.3357888j
0.7773504      +0.35116159999999996j
0.7488767999999999+0.35800319999999997j
0.7223295999999999+0.36451199999999995j]
fit1: [ 0.38237949098129903 -0.2986789052644486 ]
[ 0.34786869805033627 -0.31411241245013694  0.38233124121430384
-0.01609578865698622] 6.916408506346477e-10
[ 0.3007376765071263 -0.33709196876850367  0.28390928417584527
-0.0513342234416051 -0.00223974672899019] 1.7777965414636496e-10
E_gs: -0.33709196876850367
test mps sampling took: (0.0012726783752441406, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.11871306629299191
1 Execution time: 0:01:42.043275 ovlp:
(0.9997472000000001+0.0135456000000000046j)
2 Execution time: 0:01:42.045800 ovlp:
(0.999136+0.026323199999999999j)
3 Execution time: 0:01:42.048708 ovlp:
(0.9978208+0.043612800000000001j)
4 Execution time: 0:01:42.052188 ovlp:
(0.9960256000000001+0.0555520000000000046j)
5 Execution time: 0:01:42.056248 ovlp:
(0.9938848+0.068627200000000011j)
6 Execution time: 0:01:42.060724 ovlp:
(0.9911584+0.082812799999999991j)
7 Execution time: 0:01:42.065885 ovlp:
(0.9883071999999999+0.095539199999999994j)
8 Execution time: 0:01:42.072140 ovlp:

```

```

(0.983744+0.10842879999999999j)
x_points = [np.float64(0.0), np.float64(0.11871306629299191),
np.float64(0.23742613258598383), np.float64(0.3561391988789757),
np.float64(0.47485226517196766), np.float64(0.5935653314649596),
np.float64(0.7122783977579514), np.float64(0.8309914640509434),
np.float64(0.9497045303439353)] y_points = [1.          +0.j
0.9997472000000001+0.01354560000000005j
0.999136          +0.02632319999999999j
0.9978208         +0.04361280000000001j
0.9960256000000001+0.05555200000000005j
0.9938848         +0.06862720000000011j
0.9911584         +0.08281279999999991j
0.9883071999999999+0.09553919999999994j
0.983744          +0.10842879999999999j]
fit1: [ 0.43472089506942035 -0.26854348253202753]
[ 0.43472089506942035 -0.26854348253202753  0.43473089496942036
 -0.          ] 3.327022347073753e-11
[ 3.6945804864244630e-01 -2.4654665517620200e-01
 3.7090563154655437e-01
 -6.9058487136010774e-02  1.7244776512737057e-06]
6.161581599810699e-10
E_gs: -0.246546655176202
test mps sampling took: (0.0013079643249511719, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2520149704478931
1 Execution time: 0:01:42.611783 ovlp:
(0.9988319999999999+0.028875999999999902j)
2 Execution time: 0:01:42.613829 ovlp: (0.995682+0.05834999999999999j)
3 Execution time: 0:01:42.616586 ovlp: (0.989932+0.08831799999999999j)
4 Execution time: 0:01:42.619795 ovlp:
(0.9821139999999999+0.11444199999999993j)
5 Execution time: 0:01:42.623695 ovlp:
(0.9720340000000001+0.1430180000000001j)
x_points = [np.float64(0.0), np.float64(0.2520149704478931),
np.float64(0.5040299408957862), np.float64(0.7560449113436793),
np.float64(1.0080598817915725), np.float64(1.2600748522394656)] y_points
= [1.          +0.j
0.9988319999999999+0.02887599999999999j
0.995682          +0.05834999999999999j
0.989932          +0.08831799999999999j
0.9821139999999999+0.11444199999999993j
0.9720340000000001+0.1430180000000001j ]
fit1: [ 0.34023421322779607 -0.3414263386214316 ]
[ 0.34023421322779607 -0.3414263386214316  0.34024421312779607
 -0.          ] 7.118968986398924e-11

```



```

[ 2.7691909381910707e-01 -3.2758643941421034e-01
 2.8591396053865048e-01
 -9.0810210419460941e-02  3.8864065979896740e-06]
5.1362687329832076e-11
E_gs: -0.32758643941421034
test mps sampling took: (0.0012738704681396484, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.27474947487114526
1 Execution time: 0:01:43.409531 ovlp:
(0.9987111987111987+0.03039303039303043j)
2 Execution time: 0:01:43.411429 ovlp:
(0.9946251946251947+0.06260946260946265j)
3 Execution time: 0:01:43.414023 ovlp:
(0.9878211878211878+0.09309069309069318j)
4 Execution time: 0:01:43.417812 ovlp:
(0.978914778914779+0.12504432504432494j)
5 Execution time: 0:01:43.422087 ovlp:
(0.9663255663255663+0.1545823545823546j)
6 Execution time: 0:01:43.427539 ovlp:
(0.952969552969553+0.1848979848979848j)
7 Execution time: 0:01:43.433480 ovlp:
(0.9364599364599364+0.20968400968400958j)
8 Execution time: 0:01:43.440913 ovlp:
(0.9187875187875187+0.23524763524763515j)
9 Execution time: 0:01:43.447855 ovlp:
(0.8987498987498987+0.2592740592740592j)
x_points = [np.float64(0.0), np.float64(0.27474947487114526),
np.float64(0.5494989497422905), np.float64(0.8242484246134358),
np.float64(1.098997899484581), np.float64(1.3737473743557262),
np.float64(1.6484968492268717), np.float64(1.9232463240980169),
np.float64(2.197995798969162), np.float64(2.4727452738403075)] y_points
= [1.          +0.j
 0.9987111987111987+0.03039303039303043j
 0.9946251946251947+0.06260946260946265j
 0.9878211878211878+0.09309069309069318j
 0.978914778914779 +0.12504432504432494j
 0.9663255663255663+0.1545823545823546j
 0.952969552969553 +0.1848979848979848j
 0.9364599364599364+0.20968400968400958j
 0.9187875187875187+0.23524763524763515j
 0.8987498987498987+0.2592740592740592j ]
fit1: [ 0.3815131095055437 -0.30395451092031694]
[ 0.3815131095055437 -0.30395451092031694  0.3815231094055437
 -0.          ] 1.8346278559676332e-11
[ 2.9803833147053199e-01 -3.3695750522888007e-01

```

```

3.0710911412228953e-01
-5.1922398121453724e-02 4.2648491633427230e-06]
2.6257291551325018e-11
E_gs: -0.33695750522888007
test mps sampling took: (0.0012531280517578125, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.002180494520920975
1 Execution time: 0:01:43.895571 ovlp: (1+0.00115360000000000879j)
2 Execution time: 0:01:43.897421 ovlp: (1+0.00203200000000000338j)
3 Execution time: 0:01:43.899930 ovlp: (1-0.00096160000000000069j)
4 Execution time: 0:01:43.903089 ovlp:
(0.9999984+0.00067679999999999219j)
x_points = [np.float64(0.0), np.float64(0.002180494520920975),
np.float64(0.00436098904184195), np.float64(0.0065414835627629255),
np.float64(0.0087219780836839)] y_points = [1. +0.j 1.
+0.001153600000000009j
1. +0.002032000000000003j 1. -0.000961600000000001j
0.9999984+0.000676799999999992j]
fit1: [ 0.9999999999 -0.5 ]
[ 9.999999999000000e-01 -5.000000000000000e-01
1.000000082740371e-10
-0.000000000000000e+00] 2.525486031868591e-10
[ 9.999999999000000e-01 -5.000000000000000e-01
1.000000082740371e-10
-2.500000000000000e-01 -0.000000000000000e+00]
2.525486032334638e-10
E_gs: -0.5
test mps sampling took: (0.0013022422790527344, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.20300777343518772
1 Execution time: 0:01:44.015043 ovlp:
(0.999368+0.022232000000000003j)
2 Execution time: 0:01:44.017011 ovlp: (0.997064+0.047987999999999992j)
3 Execution time: 0:01:44.019607 ovlp:
(0.9934639999999999+0.068176000000000001j)
4 Execution time: 0:01:44.022940 ovlp: (0.988256+0.096252j)
5 Execution time: 0:01:44.026811 ovlp: (0.982056+0.116924000000000003j)
6 Execution time: 0:01:44.031341 ovlp: (0.973848+0.139424j)
7 Execution time: 0:01:44.037538 ovlp:
(0.964688+0.161548000000000002j)
8 Execution time: 0:01:44.045865 ovlp:
(0.954488+0.182547999999999993j)
9 Execution time: 0:01:44.053089 ovlp: (0.942876+0.199716j)

```

```

10 Execution time: 0:01:44.061589  ovlp:
(0.92960400000000001+0.22174800000000006j)
x_points = [np.float64(0.0), np.float64(0.20300777343518772),
np.float64(0.40601554687037544), np.float64(0.6090233203055632),
np.float64(0.8120310937407509), np.float64(1.0150388671759387),
np.float64(1.2180466406111263), np.float64(1.421054414046314),
np.float64(1.6240621874815018), np.float64(1.8270699609166896),
np.float64(2.0300777343518774)] y_points = [1.          +0.j
0.999368          +0.022232000000000003j
0.997064          +0.047987999999999992j
0.9934639999999999+0.068176000000000001j
0.988256          +0.096252j
0.982056          +0.116924000000000003j
0.973848          +0.139424j
0.964688          +0.161548000000000002j
0.954488          +0.182547999999999993j
0.942876          +0.199716j
0.92960400000000001+0.22174800000000006j]
fit1: [ 0.3848641830795131 -0.30212049044699923]
[ 0.3848641830795131 -0.30212049044699923  0.3848741829795131
-0.          ] 5.820149387470029e-11
[ 2.980025201025567e-01 -3.386575143936036e-01
3.137435378360430e-01
-5.011569816672319e-02  3.279887781026101e-06]
5.451351004685855e-11
E_gs: -0.3386575143936036
test mps sampling took: (0.0012638568878173828, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.21967714618115466
1 Execution time: 0:01:44.633227  ovlp:
(0.9991263979033549+0.024981659955984004j)
2 Execution time: 0:01:44.635305  ovlp:
(0.9965503917209402+0.051167322801574766j)
3 Execution time: 0:01:44.638477  ovlp:
(0.9926751824204378+0.0749001797604314j)
4 Execution time: 0:01:44.641945  ovlp:
(0.9863639672735214+0.10267064640955148j)
5 Execution time: 0:01:44.646325  ovlp:
(0.9788823493176384+0.12393389744135397j)
6 Execution time: 0:01:44.650930  ovlp:
(0.969642327141585+0.15009716023318465j)
7 Execution time: 0:01:44.656322  ovlp:
(0.9599431038634492+0.17198201275683056j)
8 Execution time: 0:01:44.664014  ovlp:
(0.9476118742684982+0.19415806597935825j)

```

```

9 Execution time: 0:01:44.671365  ovlp:
(0.9336006406415376+0.21635651925564625j)
10 Execution time: 0:01:44.679735  ovlp:
(0.9186038046491312+0.23548616516679632j)
11 Execution time: 0:01:44.689058  ovlp:
(0.9022293653504769+0.2566654159969983j)
12 Execution time: 0:01:44.699664  ovlp:
(0.8860509265222236+0.27204865291676694j)
13 Execution time: 0:01:44.709947  ovlp:
(0.867038880893314+0.2903326967984723j)
14 Execution time: 0:01:44.721250  ovlp:
(0.8488500372400893+0.30529593271023847j)
x_points = [np.float64(0.0), np.float64(0.21967714618115466),
np.float64(0.43935429236230933), np.float64(0.659031438543464),
np.float64(0.8787085847246187), np.float64(1.0983857309057734),
np.float64(1.318062877086928), np.float64(1.5377400232680827),
np.float64(1.7574171694492373), np.float64(1.977094315630392),
np.float64(2.196771461811547), np.float64(2.4164486079927014),
np.float64(2.636125754173856), np.float64(2.8558029003550107),
np.float64(3.0754800465361654)] y_points = [1.          +0.j
0.9991263979033549+0.024981659955984j
0.9965503917209402+0.05116732280157477j
0.9926751824204378+0.0749001797604314j
0.9863639672735214+0.10267064640955148j
0.9788823493176384+0.12393389744135397j
0.969642327141585 +0.15009716023318465j
0.9599431038634492+0.17198201275683056j
0.9476118742684982+0.19415806597935825j
0.9336006406415376+0.21635651925564625j
0.9186038046491312+0.23548616516679632j
0.9022293653504769+0.2566654159969983j
0.8860509265222236+0.27204865291676694j
0.867038880893314 +0.2903326967984723j
0.8488500372400893+0.30529593271023847j]
fit1: [ 0.38215882712603166 -0.3022125306353838 ]
[ 0.38215882712603166 -0.3022125306353838  0.38216882702603167
-0.          ] 5.465165856334757e-11
[ 3.0109280621533013e-01 -3.3631492995578260e-01
3.0615016657266397e-01
-5.0199139978967702e-02  2.6366027640547342e-06]
2.218862472124091e-11
E_gs: -0.3363149299557826
test mps sampling took: (0.0012814998626708984, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.28490326828850554

```

```

1 Execution time: 0:01:45.179450  ovlp:
(0.9985119985119986+0.030201030201030266j)
2 Execution time: 0:01:45.181372  ovlp:
(0.9941199941199941+0.06838506838506841j)
3 Execution time: 0:01:45.183905  ovlp:
(0.9873159873159874+0.09714909714909714j)
4 Execution time: 0:01:45.187235  ovlp:
(0.9775479775479776+0.13211713211713216j)
5 Execution time: 0:01:45.191163  ovlp:
(0.964017964017964+0.16223716223716234j)
6 Execution time: 0:01:45.195722  ovlp:
(0.9494859494859496+0.18963318963318954j)
7 Execution time: 0:01:45.201852  ovlp:
(0.933027933027933+0.21884121884121877j)
8 Execution time: 0:01:45.209200  ovlp:
(0.9133239133239133+0.242943242943243j)
9 Execution time: 0:01:45.216668  ovlp:
(0.8896718896718896+0.2658152658152657j)
10 Execution time: 0:01:45.224076  ovlp:
(0.8674598674598675+0.2897972897972898j)
11 Execution time: 0:01:45.231980  ovlp:
(0.8426138426138425+0.3093693093693093j)
12 Execution time: 0:01:45.240703  ovlp:
(0.815985815985816+0.32635532635532627j)
13 Execution time: 0:01:45.252417  ovlp:
(0.7895797895797896+0.3396573396573397j)
14 Execution time: 0:01:45.264925  ovlp:
(0.7625437625437625+0.35408735408735414j)
15 Execution time: 0:01:45.277580  ovlp:
(0.7323637323637324+0.3642993642993644j)
x_points = [np.float64(0.0), np.float64(0.28490326828850554),
np.float64(0.5698065365770111), np.float64(0.8547098048655166),
np.float64(1.1396130731540222), np.float64(1.4245163414425277),
np.float64(1.7094196097310332), np.float64(1.9943228780195388),
np.float64(2.2792261463080443), np.float64(2.56412941459655),
np.float64(2.8490326828850554), np.float64(3.133935951173561),
np.float64(3.4188392194620665), np.float64(3.703742487750572),
np.float64(3.9886457560390776), np.float64(4.273549024327583)] y_points
= [1.          +0.j
0.9985119985119986+0.03020103020103027j
0.9941199941199941+0.06838506838506841j
0.9873159873159874+0.09714909714909714j
0.9775479775479776+0.13211713211713216j
0.964017964017964 +0.16223716223716234j
0.9494859494859496+0.18963318963318954j
0.933027933027933 +0.21884121884121877j
0.9133239133239133+0.242943242943243j

```

0.8896718896718896+0.2658152658152657j
0.8674598674598675+0.2897972897972898j
0.8426138426138425+0.3093693093693093j
0.815985815985816 +0.32635532635532627j
0.7895797895797896+0.3396573396573397j
0.7625437625437625+0.35408735408735414j
0.7323637323637324+0.3642993642993644j]
fit1: [0.38321177570025144 -0.29841308601099664]
[0.3665137220593144 -0.3056519743609015 0.38318227620436934
-0.00750246094507005] 6.584638105892612e-10
[0.28822613084056314 -0.34386957083808223 0.305272508811647
-0.05714921540344419 -0.00101752699508466] 1.3213142212120243e-10
E_gs: -0.34386957083808223
test mps sampling took: (0.0012924671173095703, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2868230701140836
1 Execution time: 0:01:45.634555 ovlp:
(0.9985919999999999+0.03079199999999993j)
2 Execution time: 0:01:45.636474 ovlp: (0.994688+0.06772j)
3 Execution time: 0:01:45.639160 ovlp:
(0.9870639999999999+0.10179200000000001j)
4 Execution time: 0:01:45.642367 ovlp:
(0.9763839999999999+0.13176800000000001j)
5 Execution time: 0:01:45.646264 ovlp:
(0.96412800000000001+0.15992000000000006j)
6 Execution time: 0:01:45.651354 ovlp: (0.949176+0.19480800000000001j)
7 Execution time: 0:01:45.657089 ovlp: (0.930968+0.2161519999999999j)
8 Execution time: 0:01:45.663107 ovlp: (0.910744+0.2470079999999999j)
9 Execution time: 0:01:45.670787 ovlp: (0.8900159999999999+0.269072j)
10 Execution time: 0:01:45.679538 ovlp:
(0.86728+0.28947999999999996j)
11 Execution time: 0:01:45.689473 ovlp: (0.840416+0.310632j)
12 Execution time: 0:01:45.699080 ovlp:
(0.813064+0.3278479999999999j)
13 Execution time: 0:01:45.709522 ovlp: (0.78484+0.3440479999999999j)
14 Execution time: 0:01:45.720083 ovlp:
(0.757944+0.3535919999999999j)
15 Execution time: 0:01:45.733356 ovlp:
(0.727608+0.36240000000000006j)
16 Execution time: 0:01:45.746878 ovlp: (0.70234400000000001+0.368568j)
17 Execution time: 0:01:45.759101 ovlp: (0.672032+0.37519199999999997j)
18 Execution time: 0:01:45.774599 ovlp: (0.642976+0.377464j)
19 Execution time: 0:01:45.789118 ovlp:
(0.613944+0.37693599999999994j)
20 Execution time: 0:01:45.804301 ovlp:

```

(0.589208+0.373407999999999996j)
x_points = [np.float64(0.0), np.float64(0.2868230701140836),
np.float64(0.5736461402281672), np.float64(0.8604692103422508),
np.float64(1.1472922804563344), np.float64(1.4341153505704178),
np.float64(1.7209384206845015), np.float64(2.0077614907985852),
np.float64(2.2945845609126687), np.float64(2.581407631026752),
np.float64(2.8682307011408357), np.float64(3.1550537712549196),
np.float64(3.441876841369003), np.float64(3.7286999114830865),
np.float64(4.0155229815971705), np.float64(4.302346051711254),
np.float64(4.589169121825337), np.float64(4.875992191939421),
np.float64(5.162815262053504), np.float64(5.449638332167588),
np.float64(5.736461402281671)] y_points = [1.          +0.j
0.9985919999999999+0.03079199999999993j
0.994688          +0.06772j
0.9870639999999999+0.10179200000000001j
0.9763839999999999+0.13176800000000001j
0.9641280000000001+0.15992000000000006j
0.949176          +0.19480800000000001j
0.930968          +0.21615199999999999j
0.910744          +0.24700799999999999j
0.8900159999999999+0.269072j
0.86728          +0.28947999999999996j
0.840416          +0.310632j
0.813064          +0.32784799999999999j
0.78484          +0.34404799999999999j
0.757944          +0.35359199999999999j
0.727608          +0.36240000000000006j
0.7023440000000001+0.368568j
0.672032          +0.37519199999999997j
0.642976          +0.377464j
0.613944          +0.37693599999999994j
0.589208          +0.37340799999999996j]
fit1: [ 0.3803428649957335 -0.29434116852731906]
[ 0.28744147717643553 -0.34333385989379045  0.37794448938001945
-0.04889491890457185] 1.115652050750105e-09
[ 0.28625420502968524 -0.34388876902201126  0.2813068226986451
-0.05767177472878066 -0.00589339996131787] 1.119180018785899e-09
E_gs: -0.34388876902201126
test mps sampling took: (0.0013072490692138672, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.06387197545999562
1 Execution time: 0:01:46.172081 ovlp:
(0.9999296+0.007187199999999949j)
2 Execution time: 0:01:46.174015 ovlp:
(0.9997248000000001+0.014169600000000004j)

```

```

3 Execution time: 0:01:46.176593  ovlp:
(0.9994175999999999+0.0252608000000000083j)
4 Execution time: 0:01:46.179989  ovlp:
(0.9990592+0.0287872000000000013j)
5 Execution time: 0:01:46.183896  ovlp: (0.998176+0.035987200000000011j)
6 Execution time: 0:01:46.188728  ovlp: (0.9973567999999999+0.046848j)
7 Execution time: 0:01:46.194234  ovlp:
(0.99650560000000001+0.05015039999999993j)
8 Execution time: 0:01:46.200417  ovlp:
(0.99546240000000001+0.05810559999999998j)
9 Execution time: 0:01:46.207149  ovlp:
(0.9942143999999999+0.06675840000000001j)
10 Execution time: 0:01:46.214495  ovlp:
(0.992448+0.07456639999999992j)
11 Execution time: 0:01:46.222706  ovlp:
(0.9913344+0.08174719999999991j)
12 Execution time: 0:01:46.233623  ovlp:
(0.9894976+0.088640000000000005j)
13 Execution time: 0:01:46.243149  ovlp:
(0.9881088+0.09658239999999996j)
14 Execution time: 0:01:46.253157  ovlp:
(0.9858304+0.103596800000000004j)
15 Execution time: 0:01:46.265547  ovlp:
(0.98346240000000001+0.108422400000000003j)
16 Execution time: 0:01:46.278272  ovlp:
(0.9817856+0.11766399999999999j)
x_points = [np.float64(0.0), np.float64(0.06387197545999562),
np.float64(0.12774395091999124), np.float64(0.19161592637998687),
np.float64(0.2554879018399825), np.float64(0.3193598772999781),
np.float64(0.38323185275997373), np.float64(0.44710382821996936),
np.float64(0.510975803679965), np.float64(0.5748477791399607),
np.float64(0.6387197545999562), np.float64(0.7025917300599518),
np.float64(0.7664637055199475), np.float64(0.8303356809799431),
np.float64(0.8942076564399387), np.float64(0.9580796318999343),
np.float64(1.02195160735993)] y_points = [1.          +0.j
0.9999296      +0.007187199999999995j
0.99972480000000001+0.0141696j
0.9994175999999999+0.025260800000000008j
0.9990592      +0.028787200000000001j
0.998176       +0.035987200000000011j
0.9973567999999999+0.046848j
0.99650560000000001+0.05015039999999993j
0.99546240000000001+0.05810559999999998j
0.9942143999999999+0.06675840000000001j
0.992448       +0.07456639999999992j
0.9913344      +0.08174719999999991j
0.9894976      +0.088640000000000005j

```


0.9881088 +0.096582399999999996j
0.9858304 +0.103596800000000004j
0.98346240000000001+0.108422400000000003j
0.9817856 +0.117663999999999999j]
fit1: [0.35114940362869645 -0.3333505014988728]
[0.35114940362869645 -0.3333505014988728 0.35115940352869646
-0.] 8.254010516559465e-11
[2.9246874137671713e-01 -3.2644223724132027e-01
2.9532572994302692e-01
-7.0486012213408583e-02 1.5210208373780116e-06]
8.285854238299005e-11
E_gs: -0.32644223724132027
test mps sampling took: (0.001302480697631836, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2037845474726591
1 Execution time: 0:01:46.867514 ovlp:
(0.9993131984890367+0.024306653474637674j)
2 Execution time: 0:01:46.869396 ovlp:
(0.9970215934475055+0.04852150674731481j)
3 Execution time: 0:01:46.871990 ovlp:
(0.993587585892689+0.07135595698310526j)
4 Execution time: 0:01:46.875174 ovlp:
(0.9875559726231398+0.09039599887119754j)
5 Execution time: 0:01:46.879016 ovlp:
(0.9818099599819119+0.11808565978845142j)
6 Execution time: 0:01:46.883640 ovlp:
(0.973541141790512+0.13736370220014482j)
7 Execution time: 0:01:46.889055 ovlp:
(0.9647147223723893+0.16241495731290612j)
8 Execution time: 0:01:46.897109 ovlp:
(0.9543038994685789+0.18158419948523896j)
9 Execution time: 0:01:46.904531 ovlp:
(0.9419822723609992+0.20264384581646078j)
10 Execution time: 0:01:46.912942 ovlp:
(0.9298918457620606+0.22040548489206668j)
11 Execution time: 0:01:46.922279 ovlp:
(0.9148502126704678+0.2395475270045595j)
12 Execution time: 0:01:46.931175 ovlp:
(0.901270582795282+0.2568059649731229j)
13 Execution time: 0:01:46.942293 ovlp:
(0.8845765460684014+0.2693859926491837j)
14 Execution time: 0:01:46.953357 ovlp:
(0.8674609084139986+0.2898064375741627j)
15 Execution time: 0:01:46.964405 ovlp:
(0.849400068680151+0.3027468660431052j)

```

16 Execution time: 0:01:46.978356  ovlp:
(0.8312032286471029+0.31588449494588877j)
17 Execution time: 0:01:46.992224  ovlp:
(0.8106535834378836+0.32726771998898396j)
x_points = [np.float64(0.0), np.float64(0.2037845474726591),
np.float64(0.4075690949453182), np.float64(0.6113536424179773),
np.float64(0.8151381898906364), np.float64(1.0189227373632954),
np.float64(1.2227072848359546), np.float64(1.4264918323086135),
np.float64(1.6302763797812727), np.float64(1.8340609272539319),
np.float64(2.037845474726591), np.float64(2.24163002219925),
np.float64(2.445414569671909), np.float64(2.649199117144568),
np.float64(2.852983664617227), np.float64(3.0567682120898865),
np.float64(3.2605527595625454), np.float64(3.4643373070352044)]
y_points = [1.          +0.j
0.9993131984890367+0.02430665347463767j
0.9970215934475055+0.04852150674731481j
0.993587585892689 +0.07135595698310526j
0.9875559726231398+0.09039599887119754j
0.9818099599819119+0.11808565978845142j
0.973541141790512 +0.13736370220014482j
0.9647147223723893+0.16241495731290612j
0.9543038994685789+0.18158419948523896j
0.9419822723609992+0.20264384581646078j
0.9298918457620606+0.22040548489206668j
0.9148502126704678+0.2395475270045595j
0.901270582795282 +0.2568059649731229j
0.8845765460684014+0.2693859926491837j
0.8674609084139986+0.2898064375741627j
0.849400068680151 +0.3027468660431052j
0.8312032286471029+0.31588449494588877j
0.8106535834378836+0.32726771998898396j]
fit1: [ 0.378835955214048  -0.30346185242863416]
[ 0.378835955214048  -0.30346185242863416  0.378845955114048
 -0.          ] 2.639155922278044e-10
[ 2.4575523100554758e-01 -3.6713357863388091e-01
 2.8951006484468172e-01
 -9.1691642955793587e-02  3.4018223015734774e-06]
2.0925811033529259e-10
E_gs: -0.3671335786338809
test mps sampling took: (0.0012776851654052734, Counter({2: 6, 0: 4}))
truncated ham size: 12  Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224  dt: 0.16119352828960368
1 Execution time: 0:01:47.366976  ovlp:
(0.9995487992780789+0.018897630236208274j)
2 Execution time: 0:01:47.368854  ovlp:

```

(0.9982431971891155+0.037108859374175074j)
3 Execution time: 0:01:47.371430 ovlp:
(0.9961599938559902+0.0552528884046215j)
4 Execution time: 0:01:47.375279 ovlp:
(0.9931263890022224+0.07393451829522935j)
5 Execution time: 0:01:47.379565 ovlp:
(0.9882591812146899+0.09206894731031579j)
6 Execution time: 0:01:47.385035 ovlp:
(0.9839007742412389+0.11305458088732934j)
7 Execution time: 0:01:47.390853 ovlp:
(0.9773055636889019+0.13086260938017502j)
8 Execution time: 0:01:47.398108 ovlp:
(0.9696735514776824+0.1512626420202272j)
9 Execution time: 0:01:47.405846 ovlp:
(0.9641247425995882+0.16343546149673838j)
10 Execution time: 0:01:47.413870 ovlp:
(0.9551679282686851+0.1792466867946989j)
11 Execution time: 0:01:47.421971 ovlp:
(0.9469215150744241+0.20057792092467341j)
12 Execution time: 0:01:47.432258 ovlp:
(0.9368414989463982+0.2116275386040618j)
13 Execution time: 0:01:47.443076 ovlp:
(0.9247166795466872+0.22531716050745687j)
14 Execution time: 0:01:47.453227 ovlp:
(0.9150398640637825+0.24062918500669594j)
15 Execution time: 0:01:47.466516 ovlp:
(0.9021182433891894+0.25552840884545414j)
16 Execution time: 0:01:47.479429 ovlp:
(0.8864126182601892+0.26914123062596906j)
17 Execution time: 0:01:47.493302 ovlp:
(0.877331003729606+0.2810740497184796j)
18 Execution time: 0:01:47.508468 ovlp:
(0.8640349824559719+0.292603668165869j)
19 Execution time: 0:01:47.522916 ovlp:
(0.8476093561749698+0.3035092856148569j)
20 Execution time: 0:01:47.538310 ovlp:
(0.8347741356386171+0.3107188971502355j)
21 Execution time: 0:01:47.556499 ovlp:
(0.8210269136430619+0.324590919345471j)
22 Execution time: 0:01:47.572356 ovlp:
(0.8048988878382206+0.3325685321096514j)
23 Execution time: 0:01:47.590428 ovlp:
(0.7879932607892173+0.33805014088022545j)
24 Execution time: 0:01:47.610330 ovlp:
(0.7730940369504591+0.3517301627682605j)
x_points = [np.float64(0.0), np.float64(0.16119352828960368),
np.float64(0.32238705657920735), np.float64(0.48358058486881106),

```

np.float64(0.6447741131584147), np.float64(0.8059676414480184),
np.float64(0.9671611697376221), np.float64(1.1283546980272257),
np.float64(1.2895482263168294), np.float64(1.4507417546064332),
np.float64(1.6119352828960367), np.float64(1.7731288111856405),
np.float64(1.9343223394752442), np.float64(2.0955158677648478),
np.float64(2.2567093960544513), np.float64(2.4179029243440553),
np.float64(2.579096452633659), np.float64(2.7402899809232624),
np.float64(2.9014835092128664), np.float64(3.06267703750247),
np.float64(3.2238705657920734), np.float64(3.3850640940816774),
np.float64(3.546257622371281), np.float64(3.7074511506608845),
np.float64(3.8686446789504885)] y_points = [1.          +0.j
0.9995487992780789+0.01889763023620827j
0.9982431971891155+0.03710885937417507j
0.9961599938559902+0.0552528884046215j
0.9931263890022224+0.07393451829522935j
0.9882591812146899+0.09206894731031579j
0.9839007742412389+0.11305458088732934j
0.9773055636889019+0.13086260938017502j
0.9696735514776824+0.1512626420202272j
0.9641247425995882+0.16343546149673838j
0.9551679282686851+0.1792466867946989j
0.9469215150744241+0.20057792092467341j
0.9368414989463982+0.2116275386040618j
0.9247166795466872+0.22531716050745687j
0.9150398640637825+0.24062918500669594j
0.9021182433891894+0.25552840884545414j
0.8864126182601892+0.26914123062596906j
0.877331003729606 +0.2810740497184796j
0.8640349824559719+0.292603668165869j
0.8476093561749698+0.3035092856148569j
0.8347741356386171+0.3107188971502355j
0.8210269136430619+0.324590919345471j
0.8048988878382206+0.3325685321096514j
0.7879932607892173+0.33805014088022545j
0.7730940369504591+0.3517301627682605j ]
fit1: [ 0.3818649258104852 -0.30111093150854656]
[ 0.29273724666989864 -0.3437579663732923  0.3818266748918842
-0.04330554661327748] 8.232239059200271e-10
[ 0.2715437352310911 -0.3557251426381145  0.26994813697548486
-0.06330560663090433 -0.00872135878061642] 7.637412781321632e-10
E_gs: -0.3557251426381145
test mps sampling took: (0.0012924671173095703, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1505025760032408
1 Execution time: 0:01:47.963065 ovlp:

```

(0.9995951994332792+0.01721782410495365j)
2 Execution time: 0:01:47.964996 ovlp:
(0.9982887976043167+0.032011444816022694j)
3 Execution time: 0:01:47.968267 ovlp:
(0.9965867952215133+0.05189267264974173j)
4 Execution time: 0:01:47.971907 ovlp:
(0.9935231909324673+0.06846189584665408j)
5 Execution time: 0:01:47.976359 ovlp:
(0.9901099861539806+0.08819592347429284j)
6 Execution time: 0:01:47.981687 ovlp:
(0.9861355805898129+0.10353234494528296j)
7 Execution time: 0:01:47.987248 ovlp:
(0.9804223725913217+0.11642156299018813j)
8 Execution time: 0:01:47.993273 ovlp:
(0.9750587650822711+0.1373423922793493j)
9 Execution time: 0:01:48.000863 ovlp:
(0.9684531558344183+0.15156561219185716j)
10 Execution time: 0:01:48.009565 ovlp:
(0.9599431439204016+0.17072003900805455j)
11 Execution time: 0:01:48.019309 ovlp:
(0.9518287325602255+0.18507205910088276j)
12 Execution time: 0:01:48.028189 ovlp:
(0.9430427202598084+0.19740927637298689j)
13 Execution time: 0:01:48.038658 ovlp:
(0.9356459099042738+0.21292969810157736j)
14 Execution time: 0:01:48.050621 ovlp:
(0.9249186948861727+0.23014292220009103j)
15 Execution time: 0:01:48.063303 ovlp:
(0.9129310781035094+0.23792613309658628j)
16 Execution time: 0:01:48.075660 ovlp:
(0.9023418632786087+0.2523241532538145j)
17 Execution time: 0:01:48.089506 ovlp:
(0.8900046460065043+0.2685805760128064j)
18 Execution time: 0:01:48.105910 ovlp:
(0.8788542303959226+0.279031790644507j)
19 Execution time: 0:01:48.119731 ovlp:
(0.8674738144633403+0.28813980339572476j)
20 Execution time: 0:01:48.135529 ovlp:
(0.8554309976033967+0.3028690240166336j)
21 Execution time: 0:01:48.150596 ovlp:
(0.8406281768794477+0.3125382375535326j)
22 Execution time: 0:01:48.166917 ovlp:
(0.8257885561039786+0.3181594454232235j)
23 Execution time: 0:01:48.183150 ovlp:
(0.8132121384969939+0.3306438629014081j)
x_points = [np.float64(0.0), np.float64(0.1505025760032408),
np.float64(0.3010051520064816), np.float64(0.4515077280097224),

```

np.float64(0.6020103040129632), np.float64(0.752512880016204),
np.float64(0.9030154560194448), np.float64(1.0535180320226856),
np.float64(1.2040206080259264), np.float64(1.3545231840291672),
np.float64(1.505025760032408), np.float64(1.6555283360356488),
np.float64(1.8060309120388895), np.float64(1.9565334880421303),
np.float64(2.107036064045371), np.float64(2.2575386400486117),
np.float64(2.4080412160518527), np.float64(2.5585437920550937),
np.float64(2.7090463680583343), np.float64(2.859548944061575),
np.float64(3.010051520064816), np.float64(3.160554096068057),
np.float64(3.3110566720712975), np.float64(3.461559248074538)] y_points =
[1.          +0.j
 0.9995951994332792+0.01721782410495365j
 0.9982887976043167+0.03201144481602269j
 0.9965867952215133+0.05189267264974173j
 0.9935231909324673+0.06846189584665408j
 0.9901099861539806+0.08819592347429284j
 0.9861355805898129+0.10353234494528296j
 0.9804223725913217+0.11642156299018813j
 0.9750587650822711+0.1373423922793493j
 0.9684531558344183+0.15156561219185716j
 0.9599431439204016+0.17072003900805455j
 0.9518287325602255+0.18507205910088276j
 0.9430427202598084+0.19740927637298689j
 0.9356459099042738+0.21292969810157736j
 0.9249186948861727+0.23014292220009103j
 0.9129310781035094+0.23792613309658628j
 0.9023418632786087+0.2523241532538145j
 0.8900046460065043+0.2685805760128064j
 0.8788542303959226+0.279031790644507j
 0.8674738144633403+0.28813980339572476j
 0.8554309976033967+0.3028690240166336j
 0.8406281768794477+0.3125382375535326j
 0.8257885561039786+0.3181594454232235j
 0.8132121384969939+0.3306438629014081j ]
fit1: [ 0.3826502840790629 -0.30115847997035994]
[ 0.3826502840790629 -0.30115847997035994 0.3826602839790629
 -0.          ] 4.887639645074326e-10
[ 2.9350411083522271e-01 -3.4135117241782553e-01
 2.9923990512255239e-01
 -5.4791353612784525e-02 2.8142350407085258e-06]
4.848689177885312e-10
E_gs: -0.34135117241782553
test mps sampling took: (0.00127410888671875, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.009213391806858963

```

```

1 Execution time: 0:01:48.532421 ovlp: (1-0.0021470072998248657j)
2 Execution time: 0:01:48.534303 ovlp: (1+0.0052402178167405555j)
3 Execution time: 0:01:48.536934 ovlp: (1+0.0016302055426988815j)
4 Execution time: 0:01:48.540138 ovlp:
(0.9999771999224798+0.007360625026125112j)
5 Execution time: 0:01:48.544052 ovlp:
(0.9999619998707996+0.003803812932964057j)
6 Execution time: 0:01:48.548647 ovlp:
(0.9999619998707996+0.008105427558453782j)
7 Execution time: 0:01:48.553935 ovlp:
(0.9999391997932794+0.008014227248372752j)
8 Execution time: 0:01:48.560258 ovlp:
(0.9999239997415992+0.008097827532613566j)
9 Execution time: 0:01:48.566976 ovlp:
(0.9998707995607186+0.007953427041651917j)
10 Execution time: 0:01:48.574458 ovlp:
(0.9998099993539977+0.011198638075369471j)
11 Execution time: 0:01:48.582358 ovlp:
(0.9998251994056779+0.011844640271776896j)
12 Execution time: 0:01:48.592422 ovlp:
(0.9997643991989573+0.013098644535391335j)
13 Execution time: 0:01:48.602547 ovlp:
(0.9996047986563155+0.013729446680118773j)
14 Execution time: 0:01:48.614110 ovlp:
(0.9997187990439167+0.015431852468298368j)
15 Execution time: 0:01:48.624904 ovlp:
(0.9996579988371961+0.016875857377915082j)
16 Execution time: 0:01:48.638309 ovlp:
(0.9995895986046353+0.018190661848250356j)
17 Execution time: 0:01:48.651343 ovlp:
(0.9996883989405565+0.017613059884403537j)
18 Execution time: 0:01:48.666330 ovlp:
(0.9995287983979146+0.019452266137704788j)
19 Execution time: 0:01:48.681222 ovlp:
(0.999475598217034+0.023480279832951423j)
x_points = [np.float64(0.0), np.float64(0.009213391806858963),
np.float64(0.018426783613717926), np.float64(0.02764017542057689),
np.float64(0.03685356722743585), np.float64(0.046066959034294815),
np.float64(0.05528035084115378), np.float64(0.06449374264801275),
np.float64(0.0737071344548717), np.float64(0.08292052626173066),
np.float64(0.09213391806858963), np.float64(0.1013473098754486),
np.float64(0.11056070168230756), np.float64(0.11977409348916651),
np.float64(0.1289874852960255), np.float64(0.13820087710288445),
np.float64(0.1474142689097434), np.float64(0.15662766071660236),
np.float64(0.16584105252346132), np.float64(0.1750544443303203)]
y_points = [1.          +0.j
1.          -0.00214700729982487j

```

```

1.      +0.00524021781674056j
1.      +0.00163020554269888j
0.9999771999224798+0.00736062502612511j
0.9999619998707996+0.00380381293296406j
0.9999619998707996+0.00810542755845378j
0.9999391997932794+0.00801422724837275j
0.9999239997415992+0.00809782753261357j
0.9998707995607186+0.00795342704165192j
0.9998099993539977+0.01119863807536947j
0.9998251994056779+0.0118446402717769j
0.9997643991989573+0.01309864453539133j
0.9996047986563155+0.01372944668011877j
0.9997187990439167+0.01543185246829837j
0.9996579988371961+0.01687585737791508j
0.9995895986046353+0.01819066184825036j
0.9996883989405565+0.01761305988440354j
0.9995287983979146+0.01945226613770479j
0.999475598217034 +0.02348027983295142j]
fit1: [ 0.19159247011773958 -0.671633132193422 ]
[ 0.19159247011773958 -0.671633132193422  0.19160247001773958
-0.      ] 2.0617237283299316e-10
[ 1.6353229073698569e-01 -5.7363232047560442e-01
1.6347522050721713e-01
-2.1547583996947955e-01 1.4709260800811884e-06]
2.0641782881775053e-10
E_gs: -0.5736323204756044
test mps sampling took: (0.0012733936309814453, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.015742541438760534
1 Execution time: 0:01:49.018620 ovlp:
(0.9999971999971999+0.0005418005418005301j)
2 Execution time: 0:01:49.020509 ovlp:
(0.9999915999916+0.00252420252420249j)
3 Execution time: 0:01:49.023657 ovlp:
(0.999971999972+0.005629405629405726j)
4 Execution time: 0:01:49.027211 ovlp:
(0.9999523999524+0.008983808983809016j)
5 Execution time: 0:01:49.031617 ovlp:
(0.9998907998908+0.009305809305809376j)
6 Execution time: 0:01:49.036318 ovlp:
(0.9998823998823998+0.012254212254212193j)
7 Execution time: 0:01:49.041739 ovlp:
(0.9997815997815998+0.01296541296541287j)
x_points = [np.float64(0.0), np.float64(0.015742541438760534),
np.float64(0.03148508287752107), np.float64(0.0472276243162816),

```



```

np.float64(0.06297016575504213), np.float64(0.07871270719380266),
np.float64(0.0944552486325632), np.float64(0.11019779007132374)]
y_points = [1.          +0.j
0.9999971999971999+0.00054180054180053j
0.9999915999916  +0.00252420252420249j
0.999971999972   +0.00562940562940573j
0.9999523999524  +0.00898380898380902j
0.9998907998908  +0.00930580930580938j
0.9998823998823998+0.01225421225421219j
0.9997815997815998+0.01296541296541287j]
fit1: [ 0.0299747816227617 -3.9470812629171057]
[ 0.0299747816227617 -3.9470812629171057 0.0299847815227617
 -0.          ] 4.791851410167518e-11
[ 2.8005960154529663e-02 -3.6896293302607042e+00
 2.8009390519736797e-02
 -1.6470614319155075e+00 6.5997247801039176e-07]
1.9965342645566178e-10
E_gs: -3.689629330260704
test mps sampling took: (0.0012691020965576172, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2857851385083898
1 Execution time: 0:01:49.217231 ovlp:
(0.9985831985831986+0.03507983507983514j)
2 Execution time: 0:01:49.219139 ovlp:
(0.9944055944055945+0.06748706748706756j)
3 Execution time: 0:01:49.221678 ovlp:
(0.9867503867503868+0.09789229789229781j)
4 Execution time: 0:01:49.225015 ovlp:
(0.9772527772527773+0.13113393113393124j)
5 Execution time: 0:01:49.228888 ovlp:
(0.9654395654395656+0.16247436247436253j)
6 Execution time: 0:01:49.233429 ovlp:
(0.9495691495691496+0.18802438802438792j)
7 Execution time: 0:01:49.238729 ovlp:
(0.9315903315903316+0.2164948164948164j)
x_points = [np.float64(0.0), np.float64(0.2857851385083898),
np.float64(0.5715702770167796), np.float64(0.8573554155251695),
np.float64(1.1431405540335593), np.float64(1.4289256925419491),
np.float64(1.714710831050339), np.float64(2.0004959695587288)] y_points
= [1.          +0.j
0.9985831985831986+0.03507983507983514j
0.9944055944055945+0.06748706748706756j
0.9867503867503868+0.09789229789229781j
0.9772527772527773+0.13113393113393124j
0.9654395654395656+0.16247436247436253j

```

0.9495691495691496+0.18802438802438792j
0.9315903315903316+0.2164948164948164j]
fit1: [0.3911383000778738 -0.2962822885492655]
[0.3911383000778738 -0.2962822885492655 0.3911482999778738
-0.] 5.997959550395374e-11
[3.0005859611288543e-01 -3.3405224739787004e-01
2.9971462954877215e-01
-5.3659621901328579e-02 3.2528975866993347e-06]
5.635151249726194e-11
E_gs: -0.33405224739787004
test mps sampling took: (0.0012578964233398438, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.03183667698764976
1 Execution time: 0:01:49.736724 ovlp:
(0.99999319998504+0.005742612633747868j)
2 Execution time: 0:01:49.738645 ovlp:
(0.9999183998204797+0.007306616074555405j)
3 Execution time: 0:01:49.741162 ovlp:
(0.9997823995212789+0.011359424990734945j)
4 Execution time: 0:01:49.744314 ovlp:
(0.9997143993716786+0.012916628416582476j)
5 Execution time: 0:01:49.748091 ovlp:
(0.9994763988480775+0.01879184134205092j)
6 Execution time: 0:01:49.752695 ovlp:
(0.9993199985039967+0.02326625118575265j)
7 Execution time: 0:01:49.758224 ovlp:
(0.9992859984291966+0.02621065766344688j)
8 Execution time: 0:01:49.765362 ovlp:
(0.9987827973221541+0.028271062196336905j)
9 Execution time: 0:01:49.773255 ovlp:
(0.9986467970229536+0.03026346657962642j)
10 Execution time: 0:01:49.780860 ovlp:
(0.9980959958111908+0.037512282527021545j)
11 Execution time: 0:01:49.789082 ovlp:
(0.9976947949285488+0.039028685863108814j)
12 Execution time: 0:01:49.798362 ovlp:
(0.9973071940758269+0.04186429210144271j)
13 Execution time: 0:01:49.808554 ovlp:
(0.9969195932231052+0.046869103112026744j)
14 Execution time: 0:01:49.820469 ovlp:
(0.9966271925798236+0.05305711672565683j)
15 Execution time: 0:01:49.831574 ovlp:
(0.996076391368061+0.057096325611916354j)
16 Execution time: 0:01:49.845521 ovlp:
(0.9953351897374174+0.06040113288249227j)

```

17 Execution time: 0:01:49.857993  ovlp:
(0.9947163883760544+0.061754335859538934j)
x_points = [np.float64(0.0), np.float64(0.03183667698764976),
np.float64(0.06367335397529952), np.float64(0.09551003096294929),
np.float64(0.12734670795059905), np.float64(0.1591833849382488),
np.float64(0.19102006192589857), np.float64(0.22285673891354835),
np.float64(0.2546934159011981), np.float64(0.28653009288884784),
np.float64(0.3183667698764976), np.float64(0.3502034468641474),
np.float64(0.38204012385179714), np.float64(0.4138768008394469),
np.float64(0.4457134778270967), np.float64(0.47755015481474644),
np.float64(0.5093868318023962), np.float64(0.541223508790046)] y_points
= [1.          +0.j
0.99999319998504 +0.00574261263374787j
0.9999183998204797+0.00730661607455541j
0.9997823995212789+0.01135942499073495j
0.9997143993716786+0.01291662841658248j
0.9994763988480775+0.01879184134205092j
0.9993199985039967+0.02326625118575265j
0.9992859984291966+0.02621065766344688j
0.9987827973221541+0.0282710621963369j
0.9986467970229536+0.03026346657962642j
0.9980959958111908+0.03751228252702155j
0.9976947949285488+0.03902868586310881j
0.9973071940758269+0.04186429210144271j
0.9969195932231052+0.04686910311202674j
0.9966271925798236+0.05305711672565683j
0.996076391368061 +0.05709632561191635j
0.9953351897374174+0.06040113288249227j
0.9947163883760544+0.06175433585953893j]
fit1: [ 0.4847048820951849 -0.24166477171605266]
[ 0.4847048820951849 -0.24166477171605266  0.4847148819951849
-0.          ] 1.3516798194846489e-10
[ 4.1041217515657613e-01 -2.0399478735791299e-01
4.1110844301953137e-01
-8.3126201294305618e-02  1.5089183739170624e-06]
2.647214082201538e-10
E_gs: -0.203994787357913
test mps sampling took: (0.0013048648834228516, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.11431366954419565
1 Execution time: 0:01:50.263218  ovlp:
(0.9996883989405565+0.013623046318357535j)
2 Execution time: 0:01:50.265115  ovlp:
(0.9990575967958291+0.028298696215567132j)
3 Execution time: 0:01:50.267693  ovlp:

```

```

(0.9979403929973363+0.039402333967935466j)
4 Execution time: 0:01:50.270989  ovlp:
(0.9961771870024358+0.054495985286350024j)
5 Execution time: 0:01:50.274848  ovlp:
(0.9943607808266548+0.06961243668228478j)
6 Execution time: 0:01:50.279351  ovlp:
(0.9914879710591016+0.07409645192793657j)
7 Execution time: 0:01:50.284748  ovlp:
(0.9888887622217915+0.09126491030069506j)
8 Execution time: 0:01:50.290851  ovlp:
(0.985377550283671+0.10587975999118404j)
9 Execution time: 0:01:50.297629  ovlp:
(0.9818131381646698+0.11815380172292578j)
10 Execution time: 0:01:50.306991  ovlp:
(0.976987121756214+0.13235064999221002j)
11 Execution time: 0:01:50.316515  ovlp:
(0.9723511059937604+0.1424358842820066j)
12 Execution time: 0:01:50.327169  ovlp:
(0.9669094874922575+0.15126711430818873j)
13 Execution time: 0:01:50.337850  ovlp:
(0.9609966673886692+0.16578316366275647j)
14 Execution time: 0:01:50.347953  ovlp:
(0.9559502502308508+0.17895400844362874j)
15 Execution time: 0:01:50.358735  ovlp:
(0.950341431160866+0.18948764425799047j)
16 Execution time: 0:01:50.372872  ovlp:
(0.9431518067161428+0.20272688927142357j)
17 Execution time: 0:01:50.385381  ovlp:
(0.9361825830207822+0.21514533149412718j)
18 Execution time: 0:01:50.398430  ovlp:
(0.9276173538990033+0.22013094844522474j)
19 Execution time: 0:01:50.413023  ovlp:
(0.9207773306429241+0.2338489950865832j)
x_points = [np.float64(0.0), np.float64(0.11431366954419565),
np.float64(0.2286273390883913), np.float64(0.342941008632587),
np.float64(0.4572546781767826), np.float64(0.5715683477209783),
np.float64(0.685882017265174), np.float64(0.8001956868093696),
np.float64(0.9145093563535652), np.float64(1.0288230258977609),
np.float64(1.1431366954419566), np.float64(1.2574503649861521),
np.float64(1.371764034530348), np.float64(1.4860777040745434),
np.float64(1.6003913736187392), np.float64(1.7147050431629347),
np.float64(1.8290187127071305), np.float64(1.9433323822513262),
np.float64(2.0576460517955217), np.float64(2.1719597213397175)] y_points
= [1.          +0.j
0.9996883989405565+0.01362304631835753j
0.9990575967958291+0.02829869621556713j
0.9979403929973363+0.03940233396793547j

```

0.9961771870024358+0.05449598528635002j
0.9943607808266548+0.06961243668228478j
0.9914879710591016+0.07409645192793657j
0.9888887622217915+0.09126491030069506j
0.985377550283671 +0.10587975999118404j
0.9818131381646698+0.11815380172292578j
0.976987121756214 +0.13235064999221002j
0.9723511059937604+0.1424358842820066j
0.9669094874922575+0.15126711430818873j
0.9609966673886692+0.16578316366275647j
0.9559502502308508+0.17895400844362874j
0.950341431160866 +0.18948764425799047j
0.9431518067161428+0.20272688927142357j
0.9361825830207822+0.21514533149412718j
0.9276173538990033+0.22013094844522474j
0.9207773306429241+0.2338489950865832j]
fit1: [0.38128718693533753 -0.3034294873294879]
[0.38128718693533753 -0.3034294873294879 0.38129718683533753
-0.] 5.16875728583515e-10
[2.6715458561383471e-01 -3.5511374057676270e-01
2.8674252402350126e-01
-7.5095047138961757e-02 5.2307895884729797e-06]
5.82354384594568e-10
E_gs: -0.3551137405767627
test mps sampling took: (0.0013394355773925781, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1956944838850246
1 Execution time: 0:01:50.813348 ovlp:
(0.9993471985638369+0.020090644199417307j)
2 Execution time: 0:01:50.815358 ovlp:
(0.9970215934475055+0.04547510004522004j)
3 Execution time: 0:01:50.817984 ovlp:
(0.9937507862517299+0.0680851497873296j)
4 Execution time: 0:01:50.821203 ovlp:
(0.9891811761985876+0.08694839128646081j)
5 Execution time: 0:01:50.825063 ovlp:
(0.982632761792076+0.10976244147737124j)
6 Execution time: 0:01:50.829684 ovlp:
(0.976050347310764+0.13565009843021647j)
7 Execution time: 0:01:50.835001 ovlp:
(0.9673667282068021+0.15694094527007962j)
8 Execution time: 0:01:50.841231 ovlp:
(0.9588531094768409+0.17572258658969053j)
9 Execution time: 0:01:50.848107 ovlp:
(0.9471502837306243+0.19464022820850202j)

```

10 Execution time: 0:01:50.855435  ovlp:
(0.9361206594654508+0.21360546993203378j)
11 Execution time: 0:01:50.863463  ovlp:
(0.922092228602903+0.23197231033908272j)
12 Execution time: 0:01:50.873330  ovlp:
(0.9080977978151552+0.24811554585420081j)
13 Execution time: 0:01:50.884257  ovlp:
(0.8926209637661202+0.2671759877871731j)
14 Execution time: 0:01:50.896060  ovlp:
(0.8778853313477291+0.28146961923316227j)
15 Execution time: 0:01:50.907334  ovlp:
(0.8599740919430023+0.29483844864458697j)
16 Execution time: 0:01:50.921434  ovlp:
(0.8440144568318051+0.30739807627576776j)
17 Execution time: 0:01:50.934995  ovlp:
(0.8234920116824258+0.3229769105492033j)
x_points = [np.float64(0.0), np.float64(0.1956944838850246),
np.float64(0.3913889677700492), np.float64(0.5870834516550738),
np.float64(0.7827779355400984), np.float64(0.9784724194251231),
np.float64(1.1741669033101476), np.float64(1.3698613871951724),
np.float64(1.565555871080197), np.float64(1.7612503549652214),
np.float64(1.9569448388502462), np.float64(2.1526393227352707),
np.float64(2.3483338066202952), np.float64(2.5440282905053198),
np.float64(2.7397227743903447), np.float64(2.9354172582753693),
np.float64(3.131111742160394), np.float64(3.3268062260454183)] y_points =
[1.          +0.j
0.9993471985638369+0.02009064419941731j
0.9970215934475055+0.04547510004522004j
0.9937507862517299+0.0680851497873296j
0.9891811761985876+0.08694839128646081j
0.982632761792076 +0.10976244147737124j
0.976050347310764 +0.13565009843021647j
0.9673667282068021+0.15694094527007962j
0.9588531094768409+0.17572258658969053j
0.9471502837306243+0.19464022820850202j
0.9361206594654508+0.21360546993203378j
0.922092228602903 +0.23197231033908272j
0.9080977978151552+0.24811554585420081j
0.8926209637661202+0.2671759877871731j
0.8778853313477291+0.28146961923316227j
0.8599740919430023+0.29483844864458697j
0.8440144568318051+0.30739807627576776j
0.8234920116824258+0.3229769105492033j ]
fit1: [ 0.3837140677298054 -0.30040971790631354]
[ 0.3837140677298054 -0.30040971790631354 0.3837240676298054
-0.          ] 2.2248488594284868e-10
[ 3.0525987133560017e-01 -3.3507329887819742e-01

```

2.9328649380574340e-01
-4.8609634039041005e-02 2.4062055913123142e-06]
1.6430183733993348e-10
E_gs: -0.3350732988781974
test mps sampling took: (0.0012848377227783203, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.054797727920862814
1 Execution time: 0:01:51.374479 ovlp:
(0.9999619998707996+0.00492101673145684j)
2 Execution time: 0:01:51.376357 ovlp:
(0.9998099993539977+0.015576252959260017j)
3 Execution time: 0:01:51.378877 ovlp:
(0.9995135983462344+0.018958264458099228j)
4 Execution time: 0:01:51.382133 ovlp:
(0.9991563971317503+0.025836287843378658j)
5 Execution time: 0:01:51.385978 ovlp:
(0.9987003955813449+0.03220510949737232j)
6 Execution time: 0:01:51.390600 ovlp:
(0.9981227936174983+0.03883993205576908j)
7 Execution time: 0:01:51.395963 ovlp:
(0.9973019908267688+0.04366594846422478j)
8 Execution time: 0:01:51.403647 ovlp:
(0.996625588527001+0.05115957394255144j)
9 Execution time: 0:01:51.411100 ovlp:
(0.9957591855812309+0.05859999923999748j)
10 Execution time: 0:01:51.418516 ovlp:
(0.9945735815501773+0.06257481275436327j)
11 Execution time: 0:01:51.426614 ovlp:
(0.99395037943129+0.06889043422747632j)
12 Execution time: 0:01:51.434990 ovlp:
(0.9925215745733535+0.07354925006745017j)
13 Execution time: 0:01:51.445117 ovlp:
(0.991001569405336+0.08277568143731684j)
14 Execution time: 0:01:51.455574 ovlp:
(0.9897247650642012+0.08903810272954926j)
15 Execution time: 0:01:51.466317 ovlp:
(0.9877411583199383+0.09336251743255919j)
16 Execution time: 0:01:51.479437 ovlp:
(0.9860843526867991+0.10055974190312256j)
17 Execution time: 0:01:51.493410 ovlp:
(0.9848531485007048+0.10727056471992014j)
18 Execution time: 0:01:51.506445 ovlp:
(0.9831507427125252+0.1117241798622115j)
19 Execution time: 0:01:51.523136 ovlp:
(0.9807339344953774+0.12090501107703777j)

```

x_points = [np.float64(0.0), np.float64(0.054797727920862814),
np.float64(0.10959545584172563), np.float64(0.16439318376258844),
np.float64(0.21919091168345126), np.float64(0.2739886396043141),
np.float64(0.32878636752517687), np.float64(0.3835840954460397),
np.float64(0.4383818233669025), np.float64(0.4931795512877653),
np.float64(0.5479772792086282), np.float64(0.602775007129491),
np.float64(0.6575727350503537), np.float64(0.7123704629712165),
np.float64(0.7671681908920794), np.float64(0.8219659188129422),
np.float64(0.876763646733805), np.float64(0.9315613746546678),
np.float64(0.9863591025755306), np.float64(1.0411568304963934)] y_points
= [1.          +0.j
0.9999619998707996+0.00492101673145684j
0.9998099993539977+0.01557625295926002j
0.9995135983462344+0.01895826445809923j
0.9991563971317503+0.02583628784337866j
0.9987003955813449+0.03220510949737232j
0.9981227936174983+0.03883993205576908j
0.9973019908267688+0.04366594846422478j
0.996625588527001 +0.05115957394255144j
0.9957591855812309+0.05859999923999748j
0.9945735815501773+0.06257481275436327j
0.99395037943129  +0.06889043422747632j
0.9925215745733535+0.07354925006745017j
0.991001569405336 +0.08277568143731684j
0.9897247650642012+0.08903810272954926j
0.9877411583199383+0.09336251743255919j
0.9860843526867991+0.10055974190312256j
0.9848531485007048+0.10727056471992014j
0.9831507427125252+0.1117241798622115j
0.9807339344953774+0.12090501107703777j]
fit1: [ 0.3570156896057432 -0.3254880257641898]
[ 0.3570156896057432 -0.3254880257641898  0.3570256895057432
 -0.          ] 8.072768956261047e-11
[ 2.660098144647603e-01 -3.464889736827586e-01
 2.955728148587034e-01
 -8.131747081893786e-02  4.015223421413370e-06] 7.13687254589666e-11
E_gs: -0.3464889736827586
test mps sampling took: (0.0013282299041748047, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.0633687209058846
1 Execution time: 0:01:52.106125  ovlp:
(0.9999251998354397+0.007789417136717658j)
2 Execution time: 0:01:52.108271  ovlp:
(0.9996531992370383+0.015840634849396684j)
3 Execution time: 0:01:52.111147  ovlp:

```



```

(0.9992655983843164+0.024306653474637674j)
4 Execution time: 0:01:52.114900 ovlp:
(0.9989051975914347+0.031433069152752235j)
5 Execution time: 0:01:52.118967 ovlp:
(0.9981707959757511+0.03758708269158184j)
6 Execution time: 0:01:52.124445 ovlp:
(0.9973343941356672+0.04596470112234252j)
7 Execution time: 0:01:52.131013 ovlp:
(0.9965727924601435+0.04892950764491677j)
8 Execution time: 0:01:52.137323 ovlp:
(0.9953623897972577+0.05731392609063746j)
9 Execution time: 0:01:52.144890 ovlp:
(0.9940771869698113+0.06902355185181408j)
10 Execution time: 0:01:52.153627 ovlp:
(0.9930979848155665+0.07129475684846498j)
11 Execution time: 0:01:52.161919 ovlp:
(0.9917651818834001+0.08166477966251517j)
12 Execution time: 0:01:52.171697 ovlp:
(0.9895279769615493+0.08558158827949414j)
13 Execution time: 0:01:52.182954 ovlp:
(0.9878891733561814+0.09154520139944311j)
14 Execution time: 0:01:52.194899 ovlp:
(0.9864815702594545+0.10179962395917275j)
15 Execution time: 0:01:52.206965 ovlp:
(0.9847747665044864+0.11136044499297904j)
16 Execution time: 0:01:52.219470 ovlp:
(0.9817011597425513+0.11620885565948247j)
17 Execution time: 0:01:52.234627 ovlp:
(0.9801303562867838+0.1260960774113704j)
x_points = [np.float64(0.0), np.float64(0.0633687209058846),
np.float64(0.1267374418117692), np.float64(0.19010616271765382),
np.float64(0.2534748836235384), np.float64(0.31684360452942306),
np.float64(0.38021232543530764), np.float64(0.4435810463411922),
np.float64(0.5069497672470769), np.float64(0.5703184881529615),
np.float64(0.6336872090588461), np.float64(0.6970559299647306),
np.float64(0.7604246508706153), np.float64(0.8237933717764999),
np.float64(0.8871620926823844), np.float64(0.9505308135882691),
np.float64(1.0138995344941537), np.float64(1.0772682554000383)] y_points
= [1.          +0.j
0.9999251998354397+0.00778941713671766j
0.9996531992370383+0.01584063484939668j
0.9992655983843164+0.02430665347463767j
0.9989051975914347+0.03143306915275224j
0.9981707959757511+0.03758708269158184j
0.9973343941356672+0.04596470112234252j
0.9965727924601435+0.04892950764491677j
0.9953623897972577+0.05731392609063746j

```

```

0.9940771869698113+0.06902355185181408j
0.9930979848155665+0.07129475684846498j
0.9917651818834001+0.08166477966251517j
0.9895279769615493+0.08558158827949414j
0.9878891733561814+0.09154520139944311j
0.9864815702594545+0.10179962395917275j
0.9847747665044864+0.11136044499297904j
0.9817011597425513+0.11620885565948247j
0.9801303562867838+0.1260960774113704j ]
fit1: [ 0.37966788204372626 -0.3067369032602843 ]
[ 0.37966788204372626 -0.3067369032602843  0.37967788194372626
-0.          ] 2.2795636874400975e-10
[ 2.738043585160058e-01 -3.570923622851575e-01
3.035176452309765e-01
-6.342364279073119e-02  4.569578459665745e-06]
2.467397782656443e-10
E_gs: -0.3570923622851575
test mps sampling took: (0.0013051033020019531, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.19602803412133757
1 Execution time: 0:01:52.775192 ovlp: (0.999336+0.02228959999999991j)
2 Execution time: 0:01:52.777220 ovlp:
(0.99728480000000001+0.046444799999999995j)
3 Execution time: 0:01:52.779833 ovlp:
(0.9938208+0.068833600000000005j)
4 Execution time: 0:01:52.783039 ovlp: (0.98912+0.09122239999999993j)
x_points = [np.float64(0.0), np.float64(0.19602803412133757),
np.float64(0.39205606824267514), np.float64(0.5880841023640127),
np.float64(0.7841121364853503)] y_points = [1.          +0.j
0.999336          +0.02228959999999991j
0.99728480000000001+0.046444799999999995j
0.9938208          +0.068833600000000005j
0.98912           +0.09122239999999993j]
fit1: [ 0.49080125700811095 -0.24551029551208964]
[ 0.49080125700811095 -0.24551029551208964  0.49081125690811095
-0.          ] 6.589259317658112e-11
[ 4.1695787313488658e-01 -2.0823551193807752e-01
4.1777940457053209e-01
-7.4504412986823046e-02  1.5100004533395755e-06]
2.749627863647928e-10
E_gs: -0.20823551193807752
test mps sampling took: (0.0013082027435302734, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 224 2 qubit gates: 120

```

```

N gate: 224 dt: 0.09531159419039936
1 Execution time: 0:01:53.205040 ovlp:
(0.9998199994959986+0.0108108302703247j)
2 Execution time: 0:01:53.207460 ovlp:
(0.999380798266235+0.02296446430050003j)
3 Execution time: 0:01:53.210158 ovlp:
(0.9984015955244674+0.035989300770042254j)
4 Execution time: 0:01:53.213455 ovlp:
(0.9972423922786984+0.044989325970112626j)
5 Execution time: 0:01:53.218254 ovlp:
(0.9958815884684478+0.05921656580638435j)
6 Execution time: 0:01:53.223665 ovlp:
(0.9949023857266801+0.06686298721636419j)
7 Execution time: 0:01:53.230831 ovlp:
(0.9922743783682595+0.07386860683209906j)
8 Execution time: 0:01:53.238044 ovlp:
(0.9896103709090385+0.08876544854325585j)
9 Execution time: 0:01:53.245403 ovlp:
(0.986996763590938+0.09931347807773871j)
10 Execution time: 0:01:53.253241 ovlp:
(0.9837063543777922+0.10825590311652866j)
11 Execution time: 0:01:53.261788 ovlp:
(0.980754346112169+0.1200063360177408j)
12 Execution time: 0:01:53.272999 ovlp:
(0.9767943350241381+0.1298991637176583j)
13 Execution time: 0:01:53.283864 ovlp:
(0.9740799274237968+0.14275119970335926j)
14 Execution time: 0:01:53.295001 ovlp:
(0.9681975109530307+0.14970641917797378j)
15 Execution time: 0:01:53.306123 ovlp:
(0.9641294995625989+0.16070084996237988j)
16 Execution time: 0:01:53.319534 ovlp:
(0.9607814901881726+0.17090327852917997j)
17 Execution time: 0:01:53.332794 ovlp:
(0.9559214765801345+0.18443211640992585j)
18 Execution time: 0:01:53.346344 ovlp:
(0.9485558559563967+0.1929569402794329j)
x_points = [np.float64(0.0), np.float64(0.09531159419039936),
np.float64(0.19062318838079872), np.float64(0.2859347825711981),
np.float64(0.38124637676159745), np.float64(0.4765579709519968),
np.float64(0.5718695651423962), np.float64(0.6671811593327955),
np.float64(0.7624927535231949), np.float64(0.8578043477135943),
np.float64(0.9531159419039936), np.float64(1.048427536094393),
np.float64(1.1437391302847923), np.float64(1.2390507244751916),
np.float64(1.334362318665591), np.float64(1.4296739128559905),
np.float64(1.5249855070463898), np.float64(1.620297101236789),
np.float64(1.7156086954271885)] y_points = [1.          +0.j

```

0.9998199994959986+0.0108108302703247j
 0.999380798266235 +0.02296446430050003j
 0.9984015955244674+0.03598930077004225j
 0.9972423922786984+0.04498932597011263j
 0.9958815884684478+0.05921656580638435j
 0.9949023857266801+0.06686298721636419j
 0.9922743783682595+0.07386860683209906j
 0.9896103709090385+0.08876544854325585j
 0.986996763590938 +0.09931347807773871j
 0.9837063543777922+0.10825590311652866j
 0.980754346112169 +0.1200063360177408j
 0.9767943350241381+0.1298991637176583j
 0.9740799274237968+0.14275119970335926j
 0.9681975109530307+0.14970641917797378j
 0.9641294995625989+0.16070084996237988j
 0.9607814901881726+0.17090327852917997j
 0.9559214765801345+0.18443211640992585j
 0.9485558559563967+0.1929569402794329j]
 fit1: [0.38911380621929276 -0.30067765905025773]
 [0.38911380621929276 -0.30067765905025773 0.38912380611929276
 -0.] 2.5774675005018847e-10
 [2.8222466035364430e-01 -3.5057812162736923e-01
 3.2038396766062344e-01
 -5.7802253099597627e-02 3.6626464735657725e-06]
 2.8889758971130763e-10
 E_gs: -0.35057812162736923
 test mps sampling took: (0.0013191699981689453, Counter({2: 7, 0: 3}))
 truncated ham size: 12 Number of fitting points: 24
 shots per matrix element: 217391.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.06401363896641651
 1 Execution time: 0:01:53.879316 ovlp:
 (0.9999171998840799+0.00921381289933798j)
 2 Execution time: 0:01:53.881231 ovlp:
 (0.9996227994719193+0.014301420021987976j)
 3 Execution time: 0:01:53.883896 ovlp:
 (0.9992823989953585+0.020143428200799507j)
 4 Execution time: 0:01:53.887786 ovlp:
 (0.998932798505918+0.032324245253943396j)
 5 Execution time: 0:01:53.892087 ovlp:
 (0.9984175977846368+0.0376878527629938j)
 6 Execution time: 0:01:53.897699 ovlp:
 (0.9974331964064749+0.04616106462549041j)
 7 Execution time: 0:01:53.904970 ovlp:
 (0.9965959952343932+0.0491326687857363j)
 8 Execution time: 0:01:53.912508 ovlp:
 (0.9952435933410306+0.05961148345607681j)

9 Execution time: 0:01:53.920622 ovlp:
(0.9936979911771877+0.06503029104240743j)

10 Execution time: 0:01:53.928577 ovlp:
(0.991867188614064+0.07557350580290811j)

11 Execution time: 0:01:53.936964 ovlp:
(0.990744787042702+0.08021031229443731j)

12 Execution time: 0:01:53.947166 ovlp:
(0.9896407854970997+0.08831552364173301j)

13 Execution time: 0:01:54.010257 ovlp:
(0.9880583832817367+0.09637473492462889j)

14 Execution time: 0:01:54.052119 ovlp:
(0.9861079805511728+0.10132434185407857j)

15 Execution time: 0:01:54.071745 ovlp:
(0.9844059781683694+0.1092547529566541j)

16 Execution time: 0:01:54.087429 ovlp:
(0.9814435740210037+0.11455396037554455j)

17 Execution time: 0:01:54.102064 ovlp:
(0.9796219714707601+0.1247935747110045j)

18 Execution time: 0:01:54.116266 ovlp:
(0.9764847670786738+0.13514358920102487j)

19 Execution time: 0:01:54.131642 ovlp:
(0.9745435643609901+0.13949519529327348j)

20 Execution time: 0:01:54.147457 ovlp:
(0.9710567594794632+0.14668960536544762j)

21 Execution time: 0:01:54.163096 ovlp:
(0.9685911560276184+0.15015801022121433j)

22 Execution time: 0:01:54.182249 ovlp:
(0.9664843530780942+0.16030562442787422j)

23 Execution time: 0:01:54.199856 ovlp:
(0.9624271473980064+0.16512643117700354j)

x_points = [np.float64(0.0), np.float64(0.06401363896641651),
np.float64(0.12802727793283303), np.float64(0.19204091689924954),
np.float64(0.25605455586566606), np.float64(0.3200681948320826),
np.float64(0.3840818337984991), np.float64(0.44809547276491557),
np.float64(0.5121091117313321), np.float64(0.5761227506977487),
np.float64(0.6401363896641652), np.float64(0.7041500286305816),
np.float64(0.7681636675969982), np.float64(0.8321773065634147),
np.float64(0.8961909455298311), np.float64(0.9602045844962477),
np.float64(1.0242182234626642), np.float64(1.0882318624290808),
np.float64(1.1522455013954973), np.float64(1.2162591403619138),
np.float64(1.2802727793283304), np.float64(1.3442864182947467),
np.float64(1.4083000572611633), np.float64(1.4723136962275798)] y_points
= [1. +0.j
0.9999171998840799+0.00921381289933798j
0.9996227994719193+0.01430142002198798j
0.9992823989953585+0.02014342820079951j
0.998932798505918 +0.0323242452539434j

0.9984175977846368+0.0376878527629938j
0.9974331964064749+0.04616106462549041j
0.9965959952343932+0.0491326687857363j
0.9952435933410306+0.05961148345607681j
0.9936979911771877+0.06503029104240743j
0.991867188614064 +0.07557350580290811j
0.990744787042702 +0.08021031229443731j
0.9896407854970997+0.08831552364173301j
0.9880583832817367+0.09637473492462889j
0.9861079805511728+0.10132434185407857j
0.9844059781683694+0.1092547529566541j
0.9814435740210037+0.11455396037554455j
0.9796219714707601+0.1247935747110045j
0.9764847670786738+0.13514358920102487j
0.9745435643609901+0.13949519529327348j
0.9710567594794632+0.14668960536544762j
0.9685911560276184+0.15015801022121433j
0.9664843530780942+0.16030562442787422j
0.9624271473980064+0.16512643117700354j]
fit1: [0.38502455897097715 -0.30301687649366305]
[0.38502455897097715 -0.30301687649366305 0.38503455887097715
-0.] 2.316465455750061e-10
[2.8484135073986228e-01 -3.4571970936818081e-01
2.9560016079731727e-01
-6.1708615662773525e-02 4.9183171703620052e-06]
2.394723046571918e-10
E_gs: -0.3457197093681808
test mps sampling took: (0.0012891292572021484, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.06800403337301462
1 Execution time: 0:01:54.730905 ovlp:
(0.9999439999999999+0.007848000000000077j)
2 Execution time: 0:01:54.732965 ovlp:
(0.9996719999999999+0.01411999999999991j)
3 Execution time: 0:01:54.735785 ovlp:
(0.9994719999999999+0.02666400000000002j)
4 Execution time: 0:01:54.739397 ovlp:
(0.9988159999999999+0.03079999999999994j)
5 Execution time: 0:01:54.744036 ovlp: (0.99804+0.04111200000000004j)
6 Execution time: 0:01:54.749015 ovlp: (0.9970079999999999+0.048848j)
7 Execution time: 0:01:54.755697 ovlp:
(0.9958640000000001+0.05329600000000001j)
8 Execution time: 0:01:54.763208 ovlp:
(0.994848+0.06015999999999999j)
9 Execution time: 0:01:54.770568 ovlp:

(0.9931920000000001+0.07103999999999999j)
10 Execution time: 0:01:54.778901 ovlp:
(0.991536+0.07976800000000006j)
11 Execution time: 0:01:54.788377 ovlp:
(0.9903599999999999+0.08578400000000008j)
12 Execution time: 0:01:54.798945 ovlp:
(0.9881599999999999+0.09456799999999999j)
13 Execution time: 0:01:54.810532 ovlp:
(0.9866159999999999+0.10221600000000008j)
14 Execution time: 0:01:54.822460 ovlp:
(0.9838800000000001+0.10894399999999993j)
15 Execution time: 0:01:54.836782 ovlp:
(0.981576+0.11824799999999991j)
16 Execution time: 0:01:54.850814 ovlp:
(0.9787920000000001+0.12408799999999998j)
17 Execution time: 0:01:54.864148 ovlp:
(0.976864+0.13160799999999995j)
18 Execution time: 0:01:54.877740 ovlp:
(0.974024+0.13900800000000002j)
19 Execution time: 0:01:54.891361 ovlp:
(0.9720960000000001+0.14682400000000007j)
20 Execution time: 0:01:54.905762 ovlp: (0.968512+0.1528640000000001j)
x_points = [np.float64(0.0), np.float64(0.06800403337301462),
np.float64(0.13600806674602925), np.float64(0.20401210011904386),
np.float64(0.2720161334920585), np.float64(0.34002016686507314),
np.float64(0.4080242002380877), np.float64(0.47602823361110236),
np.float64(0.544032266984117), np.float64(0.6120363003571316),
np.float64(0.6800403337301463), np.float64(0.7480443671031609),
np.float64(0.8160484004761754), np.float64(0.8840524338491901),
np.float64(0.9520564672222047), np.float64(1.0200605005952195),
np.float64(1.088064533968234), np.float64(1.1560685673412485),
np.float64(1.2240726007142633), np.float64(1.2920766340872778),
np.float64(1.3600806674602925)] y_points = [1. +0.j
0.9999439999999999+0.007848000000000008j
0.9996719999999999+0.01411999999999991j
0.9994719999999999+0.026664000000000002j
0.9988159999999999+0.03079999999999994j
0.99804 +0.041112000000000004j
0.9970079999999999+0.048848j
0.9958640000000001+0.05329600000000001j
0.994848 +0.06015999999999999j
0.9931920000000001+0.07103999999999999j
0.991536 +0.07976800000000006j
0.9903599999999999+0.08578400000000008j
0.9881599999999999+0.09456799999999999j
0.9866159999999999+0.10221600000000008j
0.9838800000000001+0.10894399999999993j

0.981576 +0.11824799999999999j
0.97879200000000001+0.12408799999999998j
0.976864 +0.13160799999999995j
0.974024 +0.13900800000000000j
0.97209600000000001+0.14682400000000007j
0.968512 +0.15286400000000001j]
fit1: [0.36404616803244544 -0.31881925155655505]
[0.36404616803244544 -0.31881925155655505 0.36405616793244544
-0.] 1.42461603420306e-10
[2.9026404501382674e-01 -3.3205053186125505e-01
2.9531857795131516e-01
-6.7552250595275323e-02 2.9523895473678996e-06]
1.0759310630666386e-10
E_gs: -0.33205053186125505
test mps sampling took: (0.001280069351196289, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.25565878810099485
1 Execution time: 0:01:55.474306 ovlp:
(0.9988416+0.031078399999999995j)
2 Execution time: 0:01:55.476902 ovlp:
(0.99556479999999999+0.063584000000000008j)
3 Execution time: 0:01:55.480066 ovlp:
(0.98984319999999999+0.088844799999999995j)
4 Execution time: 0:01:55.483662 ovlp:
(0.98102399999999999+0.113446399999999995j)
5 Execution time: 0:01:55.488081 ovlp: (0.972192+0.145696000000000005j)
6 Execution time: 0:01:55.493560 ovlp:
(0.95862399999999999+0.17211519999999999j)
7 Execution time: 0:01:55.499929 ovlp:
(0.945632+0.199967999999999992j)
8 Execution time: 0:01:55.507182 ovlp:
(0.93039999999999999+0.222905600000000004j)
9 Execution time: 0:01:55.514874 ovlp:
(0.91111040000000001+0.245311999999999997j)
10 Execution time: 0:01:55.522625 ovlp:
(0.89148160000000001+0.2661376j)
11 Execution time: 0:01:55.532234 ovlp: (0.871936+0.2880384j)
12 Execution time: 0:01:55.542308 ovlp:
(0.84953600000000001+0.302464000000000007j)
13 Execution time: 0:01:55.551777 ovlp:
(0.8258368+0.320281599999999994j)
14 Execution time: 0:01:55.561914 ovlp: (0.80230399999999999+0.33568j)
15 Execution time: 0:01:55.575014 ovlp:
(0.7755264+0.348153600000000006j)
16 Execution time: 0:01:55.588116 ovlp:


```

(0.7515712000000001+0.35407999999999995j)
x_points = [np.float64(0.0), np.float64(0.25565878810099485),
np.float64(0.5113175762019897), np.float64(0.7669763643029845),
np.float64(1.0226351524039794), np.float64(1.2782939405049742),
np.float64(1.533952728605969), np.float64(1.789611516706964),
np.float64(2.045270304807959), np.float64(2.3009290929089534),
np.float64(2.5565878810099485), np.float64(2.8122466691109436),
np.float64(3.067905457211938), np.float64(3.323564245312933),
np.float64(3.579223033413928), np.float64(3.834881821514923),
np.float64(4.090540609615918)] y_points = [1.          +0.j
0.9988416      +0.031078399999999995j
0.9955647999999999+0.063584000000000008j
0.9898431999999999+0.088844799999999995j
0.9810239999999999+0.113446399999999995j
0.972192      +0.145696000000000005j
0.9586239999999999+0.17211519999999999j
0.945632      +0.199967999999999992j
0.9303999999999999+0.222905600000000004j
0.9111104000000001+0.245311999999999997j
0.8914816000000001+0.2661376j
0.871936      +0.2880384j
0.8495360000000001+0.302464000000000007j
0.8258368      +0.320281599999999994j
0.8023039999999999+0.33568j
0.7755264      +0.348153600000000006j
0.7515712000000001+0.35407999999999995j]
fit1: [ 0.38085680286406826 -0.29990626209217935]
[ 0.3593541942155329 -0.309139454789951  0.38084684220838233
-0.00993189468904821] 1.008509513190335e-09
[ 0.2927156282899032 -0.3415407952404795  0.28234403049944795
-0.0568168780257221 -0.00148488664894184] 3.1745220043215855e-10
E_gs: -0.3415407952404795
test mps sampling took: (0.001318216323852539, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.21353552047874086
1 Execution time: 0:01:55.987977 ovlp:
(0.9993159980847945+0.023605266094745003j)
2 Execution time: 0:01:55.990720 ovlp:
(0.9966807907062141+0.047300532441490795j)
3 Execution time: 0:01:55.993643 ovlp:
(0.9925407791141816+0.07428620800138241j)
4 Execution time: 0:01:55.997078 ovlp:
(0.987104763893339+0.0998822796703831j)
5 Execution time: 0:01:56.001184 ovlp:
(0.9799479438542429+0.12396634710577192j)

```

```

6 Execution time: 0:01:56.006608 ovlp:
(0.9705303174848889+0.14411920353376995j)
7 Execution time: 0:01:56.012776 ovlp:
(0.9612926916195366+0.17008247623093342j)
8 Execution time: 0:01:56.019475 ovlp:
(0.9498230595045667+0.1929569402794329j)
9 Execution time: 0:01:56.026106 ovlp:
(0.9372734243655882+0.20965378703060367j)
10 Execution time: 0:01:56.033667 ovlp:
(0.9227365836624342+0.22849623978947142j)
11 Execution time: 0:01:56.041929 ovlp:
(0.9078037418504772+0.24653949031057287j)
12 Execution time: 0:01:56.051001 ovlp:
(0.8914092959460287+0.26591474456128483j)
13 Execution time: 0:01:56.065306 ovlp:
(0.8747052491746976+0.2847571973201526j)
14 Execution time: 0:01:56.082506 ovlp:
(0.8562083973835126+0.2998124394748305j)
15 Execution time: 0:01:56.096693 ovlp:
(0.8351627384556677+0.3132764771741361j)
16 Execution time: 0:01:56.110041 ovlp:
(0.8157298840436753+0.3292677219496214j)
17 Execution time: 0:01:56.126672 ovlp:
(0.7972906324137707+0.3394701505164215j)
18 Execution time: 0:01:56.142874 ovlp:
(0.7761801733044853+0.34837657545441125j)
x_points = [np.float64(0.0), np.float64(0.21353552047874086),
np.float64(0.4270710409574817), np.float64(0.6406065614362226),
np.float64(0.8541420819149634), np.float64(1.0676776023937042),
np.float64(1.2812131228724453), np.float64(1.494748643351186),
np.float64(1.7082841638299269), np.float64(1.9218196843086677),
np.float64(2.1353552047874085), np.float64(2.3488907252661493),
np.float64(2.5624262457448905), np.float64(2.7759617662236313),
np.float64(2.989497286702372), np.float64(3.203032807181113),
np.float64(3.4165683276598537), np.float64(3.6301038481385945),
np.float64(3.8436393686173354)] y_points = [1.          +0.j
0.9993159980847945+0.023605266094745j
0.9966807907062141+0.04730053244149079j
0.9925407791141816+0.07428620800138241j
0.987104763893339 +0.0998822796703831j
0.9799479438542429+0.12396634710577192j
0.9705303174848889+0.14411920353376995j
0.9612926916195366+0.17008247623093342j
0.9498230595045667+0.1929569402794329j
0.9372734243655882+0.20965378703060367j
0.9227365836624342+0.22849623978947142j
0.9078037418504772+0.24653949031057287j

```

0.8914092959460287+0.26591474456128483j
0.8747052491746976+0.2847571973201526j
0.8562083973835126+0.2998124394748305j
0.8351627384556677+0.3132764771741361j
0.8157298840436753+0.3292677219496214j
0.7972906324137707+0.3394701505164215j
0.7761801733044853+0.34837657545441125j]
fit1: [0.38530008787364306 -0.29859488170386844]
[0.38530008787364306 -0.29859488170386844 0.38531008777364306
-0.] 7.609750895679684e-10
[2.8116876134421609e-01 -3.4719743633845473e-01
2.9880794778780140e-01
-6.4903997358630672e-02 2.2885334780327483e-06]
2.551981202531931e-10
E_gs: -0.34719743633845473
test mps sampling took: (0.0012869834899902344, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.25985819562104334
1 Execution time: 0:01:56.512679 ovlp:
(0.9988903962273472+0.02887629817941373j)
2 Execution time: 0:01:56.514609 ovlp:
(0.9952955840049855+0.0626204129094039j)
3 Execution time: 0:01:56.517244 ovlp:
(0.9891243630228344+0.09592372614066891j)
4 Execution time: 0:01:56.520576 ovlp:
(0.9804907336684945+0.11832100229140785j)
5 Execution time: 0:01:56.524436 ovlp:
(0.9710819016784658+0.14487549257667487j)
6 Execution time: 0:01:56.529013 ovlp:
(0.9581390576727962+0.17612679883111593j)
7 Execution time: 0:01:56.534502 ovlp:
(0.9426274049331769+0.20075848257884066j)
8 Execution time: 0:01:56.541202 ovlp:
(0.9262341491961072+0.22392336133942847j)
9 Execution time: 0:01:56.549049 ovlp:
(0.9104792956296051+0.25034105115957384j)
10 Execution time: 0:01:56.557620 ovlp:
(0.8891080229672781+0.27201632485550453j)
11 Execution time: 0:01:56.565866 ovlp:
(0.8668551473075008+0.28788517880960796j)
12 Execution time: 0:01:56.575691 ovlp:
(0.8437586687794738+0.30878524986984957j)
13 Execution time: 0:01:56.585514 ovlp:
(0.8215133931455367+0.321880094392321j)
14 Execution time: 0:01:56.597786 ovlp:

```

(0.7946929019558666+0.33632014348848793j)
15 Execution time: 0:01:56.610487  ovlp:
(0.769286015572453+0.35243979829531424j)
16 Execution time: 0:01:56.622984  ovlp:
(0.7452167337368947+0.35804101733945903j)
17 Execution time: 0:01:56.636669  ovlp:
(0.7174234392396934+0.36747264940700797j)
18 Execution time: 0:01:56.649824  ovlp:
(0.6888777421843235+0.37111306178441006j)
19 Execution time: 0:01:56.665950  ovlp:
(0.6661688649741409+0.3737578707767606j)
x_points = [np.float64(0.0), np.float64(0.25985819562104334),
np.float64(0.5197163912420867), np.float64(0.7795745868631301),
np.float64(1.0394327824841734), np.float64(1.2992909781052167),
np.float64(1.5591491737262602), np.float64(1.8190073693473034),
np.float64(2.0788655649683467), np.float64(2.33872376058939),
np.float64(2.5985819562104333), np.float64(2.8584401518314766),
np.float64(3.1182983474525203), np.float64(3.3781565430735636),
np.float64(3.638014738694607), np.float64(3.89787293431565),
np.float64(4.1577311299366935), np.float64(4.417589325557737),
np.float64(4.67744752117878), np.float64(4.937305716799823)] y_points =
[1.          +0.j
0.9988903962273472+0.02887629817941373j
0.9952955840049855+0.0626204129094039j
0.9891243630228344+0.09592372614066891j
0.9804907336684945+0.11832100229140785j
0.9710819016784658+0.14487549257667487j
0.9581390576727962+0.17612679883111593j
0.9426274049331769+0.20075848257884066j
0.9262341491961072+0.22392336133942847j
0.9104792956296051+0.25034105115957384j
0.8891080229672781+0.27201632485550453j
0.8668551473075008+0.28788517880960796j
0.8437586687794738+0.30878524986984957j
0.8215133931455367+0.321880094392321j
0.7946929019558666+0.33632014348848793j
0.769286015572453 +0.35243979829531424j
0.7452167337368947+0.35804101733945903j
0.7174234392396934+0.36747264940700797j
0.6888777421843235+0.37111306178441006j
0.6661688649741409+0.3737578707767606j ]
fit1: [ 0.3806015325196096 -0.29749251864458903]
[ 0.3028849159679257 -0.33664461370627397 0.38057747457038393
-0.03855150402199476] 8.51736764402467e-10
[ 0.28157334982396726 -0.3474280849525516 0.2833519573154618
-0.06343855826616122 -0.00324990687488864] 7.044614697015744e-10
E_gs: -0.3474280849525516

```

```

test mps sampling took: (0.0013380050659179688, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.02735441891172615
1 Execution time: 0:01:57.090862 ovlp:
(0.99998559997696+0.004257606812170911j)
2 Execution time: 0:01:57.092909 ovlp:
(0.9999375999001598+0.005798409277454786j)
3 Execution time: 0:01:57.095622 ovlp:
(0.9999087998540799+0.011520018432029433j)
4 Execution time: 0:01:57.099512 ovlp:
(0.9997839996543993+0.01769762831620536j)
5 Execution time: 0:01:57.103700 ovlp:
(0.999663999462399+0.011352018163229172j)
6 Execution time: 0:01:57.109401 ovlp:
(0.9994863991782388+0.01849442959108738j)
7 Execution time: 0:01:57.114889 ovlp:
(0.9993327989324783+0.02196483514373626j)
8 Execution time: 0:01:57.122406 ovlp:
(0.9991167985868776+0.027859244574791386j)
9 Execution time: 0:01:57.130148 ovlp:
(0.9989775983641573+0.0301584482535171j)
10 Execution time: 0:01:57.137884 ovlp:
(0.9986655978649566+0.03175685081096136j)
11 Execution time: 0:01:57.146044 ovlp:
(0.9984303974886359+0.03362405379848599j)
12 Execution time: 0:01:57.156446 ovlp:
(0.9979647967436749+0.03919206270730036j)
x_points = [np.float64(0.0), np.float64(0.02735441891172615),
np.float64(0.0547088378234523), np.float64(0.08206325673517845),
np.float64(0.1094176756469046), np.float64(0.13677209455863076),
np.float64(0.1641265134703569), np.float64(0.19148093238208305),
np.float64(0.2188353512938092), np.float64(0.24618977020553537),
np.float64(0.2735441891172615), np.float64(0.30089860802898766),
np.float64(0.3282530269407138)] y_points = [1.          +0.j
0.99998559997696 +0.00425760681217091j
0.9999375999001598+0.00579840927745479j
0.9999087998540799+0.01152001843202943j
0.9997839996543993+0.01769762831620536j
0.999663999462399 +0.01135201816322917j
0.9994863991782388+0.01849442959108738j
0.9993327989324783+0.02196483514373626j
0.9991167985868776+0.02785924457479139j
0.9989775983641573+0.0301584482535171j
0.9986655978649566+0.03175685081096136j
0.9984303974886359+0.03362405379848599j

```

```

0.9979647967436749+0.03919206270730036j]
fit1: [ 0.2816357184128344 -0.4238074436809112]
[ 0.2816357184128344 -0.4238074436809112 0.2816457183128344
-0.          ] 5.631079810630611e-10
[ 2.4179159052601479e-01 -3.6377298930964691e-01
2.4179326382061259e-01
-1.2345801729647360e-01 1.4166744053056285e-06]
5.459551165336098e-10
E_gs: -0.3637729893096469
test mps sampling took: (0.0012929439544677734, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.27659080557011057
1 Execution time: 0:01:57.528939 ovlp:
(0.9986520000000001+0.031624000000000096j)
2 Execution time: 0:01:57.530815 ovlp: (0.994624+0.06351400000000007j)
3 Execution time: 0:01:57.533938 ovlp:
(0.9878279999999999+0.097134000000000005j)
4 Execution time: 0:01:57.537456 ovlp: (0.978748+0.12691199999999999j)
5 Execution time: 0:01:57.541832 ovlp:
(0.9665699999999999+0.15625399999999999j)
x_points = [np.float64(0.0), np.float64(0.27659080557011057),
np.float64(0.5531816111402211), np.float64(0.8297724167103318),
np.float64(1.1063632222804423), np.float64(1.3829540278505528)]
y_points = [1.          +0.j
0.9986520000000001+0.0316240000000001j
0.994624          +0.06351400000000007j
0.9878279999999999+0.097134000000000005j
0.978748          +0.12691199999999999j
0.9665699999999999+0.15625399999999999j ]
fit1: [ 0.3404764792491146 -0.3432770997764796]
[ 0.3404764792491146 -0.3432770997764796 0.3404864791491146
-0.          ] 2.222160992455635e-10
[ 2.7065235245815872e-01 -3.1996439247330188e-01
2.8017666195487689e-01
-1.0932384851755708e-01 2.6518202350487514e-06]
2.407671852804543e-10
E_gs: -0.3199643924733019
test mps sampling took: (0.0013289451599121094, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.27881513741224223
1 Execution time: 0:01:58.204488 ovlp:
(0.9986247994499198+0.033255613302245246j)
2 Execution time: 0:01:58.206416 ovlp:

```

(0.994419997767999+0.0674652269860907j)
3 Execution time: 0:01:58.208992 ovlp:
(0.9878295951318381+0.09618363847345535j)
4 Execution time: 0:01:58.212300 ovlp:
(0.9782727913091165+0.12565325026130014j)
5 Execution time: 0:01:58.216190 ovlp:
(0.9661071864428745+0.155648462259385j)
6 Execution time: 0:01:58.220829 ovlp:
(0.9517839807135924+0.18533407413362957j)
x_points = [np.float64(0.0), np.float64(0.27881513741224223),
np.float64(0.5576302748244845), np.float64(0.8364454122367266),
np.float64(1.115260549648969), np.float64(1.3940756870612112),
np.float64(1.6728908244734533)] y_points = [1. +0.j
0.9986247994499198+0.03325561330224525j
0.994419997767999 +0.0674652269860907j
0.9878295951318381+0.09618363847345535j
0.9782727913091165+0.12565325026130014j
0.9661071864428745+0.155648462259385j
0.9517839807135924+0.18533407413362957j]
fit1: [0.4035149979491036 -0.2874773534876078]
[0.4035149979491036 -0.2874773534876078 0.4035249978491036
-0.] 1.0557942970079711e-10
[3.0700210775263698e-01 -3.3104820318725314e-01
3.0400520337561177e-01
-4.8842839071852960e-02 5.1497875603437598e-06]
5.022795461258506e-11
E_gs: -0.33104820318725314
test mps sampling took: (0.0012707710266113281, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.04225139120258822
1 Execution time: 0:01:58.806329 ovlp:
(0.9999471998310394+0.0017424055756978252j)
2 Execution time: 0:01:58.808227 ovlp:
(0.9998591995494386+0.01113203562251397j)
3 Execution time: 0:01:58.810771 ovlp:
(0.9997623992396776+0.016016051251364072j)
4 Execution time: 0:01:58.814093 ovlp:
(0.999419198141434+0.015364849167517347j)
5 Execution time: 0:01:58.817969 ovlp:
(0.9993399978879933+0.024877679608574788j)
6 Execution time: 0:01:58.822547 ovlp:
(0.9988647963673485+0.029268893660459705j)
7 Execution time: 0:01:58.827911 ovlp:
(0.9984159949311837+0.03427610968355088j)
8 Execution time: 0:01:58.833848 ovlp:

```

(0.9978967932697385+0.041712133478827074j)
9 Execution time: 0:01:58.842077 ovlp:
(0.9974479918335739+0.045038544123341184j)
10 Execution time: 0:01:58.850986 ovlp:
(0.9968231898342075+0.04646414868527571j)
11 Execution time: 0:01:58.859172 ovlp:
(0.9962071878630012+0.053011369636382755j)
12 Execution time: 0:01:58.868451 ovlp:
(0.9956087859481151+0.0644690063008202j)
13 Execution time: 0:01:58.880059 ovlp:
(0.9944031820901826+0.06417860537153719j)
14 Execution time: 0:01:58.892427 ovlp:
(0.9936287796120948+0.06663381322820228j)
15 Execution time: 0:01:58.904369 ovlp:
(0.9927487767960856+0.07352423527755292j)
16 Execution time: 0:01:58.918264 ovlp:
(0.9920535745714387+0.07703544651342886j)
17 Execution time: 0:01:58.932443 ovlp:
(0.9904871695589426+0.08299306557780994j)
18 Execution time: 0:01:58.946699 ovlp:
(0.9900295680946178+0.08510507233623144j)
19 Execution time: 0:01:58.963900 ovlp:
(0.9892815657010103+0.09018268858460354j)
20 Execution time: 0:01:58.980104 ovlp:
(0.9874599598718716+0.0990795170544545j)
21 Execution time: 0:01:58.999351 ovlp:
(0.9866415572529832+0.09990671970150311j)
22 Execution time: 0:01:59.016166 ovlp:
(0.984758351226724+0.1036731317540216j)
x_points = [np.float64(0.0), np.float64(0.04225139120258822),
np.float64(0.08450278240517645), np.float64(0.12675417360776467),
np.float64(0.1690055648103529), np.float64(0.21125695601294112),
np.float64(0.25350834721552934), np.float64(0.29575973841811753),
np.float64(0.3380111296207058), np.float64(0.38026252082329404),
np.float64(0.42251391202588223), np.float64(0.4647653032284704),
np.float64(0.5070166944310587), np.float64(0.5492680856336469),
np.float64(0.5915194768362351), np.float64(0.6337708680388233),
np.float64(0.6760222592414116), np.float64(0.7182736504439998),
np.float64(0.7605250416465881), np.float64(0.8027764328491762),
np.float64(0.8450278240517645), np.float64(0.8872792152543527),
np.float64(0.9295306064569409)] y_points = [1.          +0.j
0.9999471998310394+0.00174240557569783j
0.9998591995494386+0.01113203562251397j
0.9997623992396776+0.01601605125136407j
0.999419198141434 +0.01536484916751735j
0.9993399978879933+0.02487767960857479j
0.9988647963673485+0.0292688936604597j

```


0.9984159949311837+0.03427610968355088j
 0.9978967932697385+0.04171213347882707j
 0.9974479918335739+0.04503854412334118j
 0.9968231898342075+0.04646414868527571j
 0.9962071878630012+0.05301136963638275j
 0.9956087859481151+0.0644690063008202j
 0.9944031820901826+0.06417860537153719j
 0.9936287796120948+0.06663381322820228j
 0.9927487767960856+0.07352423527755292j
 0.9920535745714387+0.07703544651342886j
 0.9904871695589426+0.08299306557780994j
 0.9900295680946178+0.08510507233623144j
 0.9892815657010103+0.09018268858460354j
 0.9874599598718716+0.0990795170544545j
 0.9866415572529832+0.09990671970150311j
 0.984758351226724 +0.1036731317540216j]
 fit1: [0.37791790533726904 -0.30894515916376053]
 [0.37791790533726904 -0.30894515916376053 0.37792790523726905
 -0.] 9.029178376741887e-10
 [2.8166058724638021e-01 -3.5071423537571539e-01
 3.0634311419694554e-01
 -5.8766691329126992e-02 3.6566626963355956e-06]
 8.855648929863054e-10
 E_gs: -0.3507142353757154
 test mps sampling took: (0.0013039112091064453, Counter({2: 6, 0: 4}))
 truncated ham size: 12 Number of fitting points: 15
 shots per matrix element: 357142.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.07112769282102428
 1 Execution time: 0:01:59.604268 ovlp:
 (0.9999327998387195+0.007016816840360374j)
 2 Execution time: 0:01:59.606713 ovlp:
 (0.999641599139838+0.016380039312094308j)
 3 Execution time: 0:01:59.609533 ovlp:
 (0.9992775982662359+0.024673659216782218j)
 4 Execution time: 0:01:59.612954 ovlp:
 (0.9987063968953525+0.03232887758930625j)
 5 Execution time: 0:01:59.617651 ovlp:
 (0.9977039944895867+0.040784897883754834j)
 6 Execution time: 0:01:59.622793 ovlp:
 (0.9967855922854214+0.050708121699492015j)
 7 Execution time: 0:01:59.628412 ovlp:
 (0.995654389570535+0.05794893907745369j)
 8 Execution time: 0:01:59.635261 ovlp:
 (0.9945007868018882+0.06358815261156625j)
 9 Execution time: 0:01:59.643001 ovlp:
 (0.9929887831730797+0.07733618560684552j)

10 Execution time: 0:01:59.650690 ovlp:
(0.9908887781330675+0.08184419642607144j)
11 Execution time: 0:01:59.658827 ovlp:
(0.9895335748805798+0.09024981659955977j)
12 Execution time: 0:01:59.668988 ovlp:
(0.9871927692626463+0.0969922327813586j)
13 Execution time: 0:01:59.680174 ovlp:
(0.9854343650424762+0.10513465232316554j)
14 Execution time: 0:01:59.691897 ovlp:
(0.9828639588735013+0.1134786723488137j)
x_points = [np.float64(0.0), np.float64(0.07112769282102428),
np.float64(0.14225538564204857), np.float64(0.21338307846307286),
np.float64(0.28451077128409713), np.float64(0.3556384641051214),
np.float64(0.4267661569261457), np.float64(0.49789384974717),
np.float64(0.5690215425681943), np.float64(0.6401492353892185),
np.float64(0.7112769282102428), np.float64(0.7824046210312671),
np.float64(0.8535323138522914), np.float64(0.9246600066733157),
np.float64(0.99578769949434)] y_points = [1. +0.j
0.9999327998387195+0.00701681684036037j
0.999641599139838 +0.01638003931209431j
0.9992775982662359+0.02467365921678222j
0.9987063968953525+0.03232887758930625j
0.9977039944895867+0.04078489788375483j
0.9967855922854214+0.05070812169949201j
0.995654389570535 +0.05794893907745369j
0.9945007868018882+0.06358815261156625j
0.9929887831730797+0.07733618560684552j
0.9908887781330675+0.08184419642607144j
0.9895335748805798+0.09024981659955977j
0.9871927692626463+0.0969922327813586j
0.9854343650424762+0.10513465232316554j
0.9828639588735013+0.1134786723488137j]
fit1: [0.35917177841774334 -0.3256425534261555]
[0.35917177841774334 -0.3256425534261555 0.35918177831774334
-0.] 9.653323080070626e-11
[2.4759198817638867e-01 -3.5346188929411948e-01
2.8832659892162926e-01
-1.0258613132710091e-01 6.2844645215867644e-06]
7.477723060029305e-11
E_gs: -0.3534618892941195
test mps sampling took: (0.0012722015380859375, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.132412698564289
1 Execution time: 0:02:00.263573 ovlp:
(0.9997263992339178+0.015519643455001564j)

```

2 Execution time: 0:02:00.265455 ovlp:
(0.9988191966937507+0.03229569042793323j)
3 Execution time: 0:02:00.268015 ovlp:
(0.9971487920166175+0.045838928348999275j)
4 Execution time: 0:02:00.271324 ovlp:
(0.9950751862105214+0.06003016808447059j)
5 Execution time: 0:02:00.275212 ovlp:
(0.9925407791141816+0.07515021042058923j)
6 Execution time: 0:02:00.279792 ovlp:
(0.9887319684495117+0.09289826011512825j)
7 Execution time: 0:02:00.286015 ovlp:
(0.9852327586517242+0.10541909517346659j)
8 Execution time: 0:02:00.292962 ovlp:
(0.9805167454468873+0.12182794111823503j)
9 Execution time: 0:02:00.300654 ovlp:
(0.9754911313751677+0.1348743776482575j)
10 Execution time: 0:02:00.308205 ovlp:
(0.9702351166583267+0.14771201359363806j)
11 Execution time: 0:02:00.316169 ovlp:
(0.9639350990182773+0.1603552489946971j)
12 Execution time: 0:02:00.325947 ovlp:
(0.9565694783945395+0.18092570659197849j)
13 Execution time: 0:02:00.337120 ovlp:
(0.9499814599480878+0.18928492999780389j)
14 Execution time: 0:02:00.349003 ovlp:
(0.9401606324497709+0.20634177775697782j)
15 Execution time: 0:02:00.360322 ovlp:
(0.9338246147089211+0.21676740694873953j)
16 Execution time: 0:02:00.374037 ovlp:
(0.9251773904966933+0.23000824402308329j)
17 Execution time: 0:02:00.386585 ovlp:
(0.9156013636838183+0.24193867742829678j)
18 Execution time: 0:02:00.402013 ovlp:
(0.9044557324760509+0.2550283140792795j)
x_points = [np.float64(0.0), np.float64(0.132412698564289),
np.float64(0.264825397128578), np.float64(0.397238095692867),
np.float64(0.529650794257156), np.float64(0.662063492821445),
np.float64(0.794476191385734), np.float64(0.9268888899500229),
np.float64(1.059301588514312), np.float64(1.191714287078601),
np.float64(1.32412698564289), np.float64(1.456539684207179),
np.float64(1.588952382771468), np.float64(1.721365081335757),
np.float64(1.8537777799000459), np.float64(1.986190478464335),
np.float64(2.118603177028624), np.float64(2.251015875592913),
np.float64(2.383428574157202)] y_points = [1.          +0.j
0.9997263992339178+0.01551964345500156j
0.9988191966937507+0.03229569042793323j
0.9971487920166175+0.04583892834899927j

```

0.9950751862105214+0.06003016808447059j
 0.9925407791141816+0.07515021042058923j
 0.9887319684495117+0.09289826011512825j
 0.9852327586517242+0.10541909517346659j
 0.9805167454468873+0.12182794111823503j
 0.9754911313751677+0.1348743776482575j
 0.9702351166583267+0.14771201359363806j
 0.9639350990182773+0.1603552489946971j
 0.9565694783945395+0.18092570659197849j
 0.9499814599480878+0.18928492999780389j
 0.9401606324497709+0.20634177775697782j
 0.9338246147089211+0.21676740694873953j
 0.9251773904966933+0.23000824402308329j
 0.9156013636838183+0.24193867742829678j
 0.9044557324760509+0.2550283140792795j]
 fit1: [0.3862807047713716 -0.30077601933551285]
 [0.3862807047713716 -0.30077601933551285 0.3862907046713716
 -0.] 1.8012816111505635e-10
 [2.9647661748540494e-01 -3.4171576047365754e-01
 2.9906956001446133e-01
 -5.1893583427244525e-02 4.1047923584402527e-06]
 2.405188918149252e-10
 E_gs: -0.34171576047365754
 test mps sampling took: (0.0012907981872558594, Counter({0: 6, 2: 4}))
 truncated ham size: 12 Number of fitting points: 18
 shots per matrix element: 294117.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.12331317223348316
 1 Execution time: 0:02:00.783938 ovlp:
 (0.9997211993866386+0.013963830720427506j)
 2 Execution time: 0:02:00.785875 ovlp:
 (0.9990343978756753+0.02574145663120464j)
 3 Execution time: 0:02:00.788564 ovlp:
 (0.9977559950631891+0.04177589190696218j)
 4 Execution time: 0:02:00.791779 ovlp:
 (0.995430389946858+0.05901392983064557j)
 5 Execution time: 0:02:00.795665 ovlp:
 (0.9936147859525291+0.07380396236871722j)
 6 Execution time: 0:02:00.800214 ovlp:
 (0.9907383796244351+0.08514638732205215j)
 7 Execution time: 0:02:00.805541 ovlp:
 (0.9867331708129758+0.0970192134422696j)
 8 Execution time: 0:02:00.811672 ovlp:
 (0.9831427629140783+0.11709285760428667j)
 9 Execution time: 0:02:00.818540 ovlp:
 (0.9788043533695774+0.12563367639408796j)
 10 Execution time: 0:02:00.825907 ovlp:

```

(0.9726639398606678+0.14056650924632041j)
11 Execution time: 0:02:00.835608  ovlp:
(0.9672103278627213+0.15344573758062263j)
12 Execution time: 0:02:00.845982  ovlp:
(0.9621307166875768+0.16153095536810191j)
13 Execution time: 0:02:00.857699  ovlp:
(0.9546847003063408+0.17967339528146953j)
14 Execution time: 0:02:00.867961  ovlp:
(0.9490474879044735+0.19080501977104358j)
15 Execution time: 0:02:00.878851  ovlp:
(0.9409146700122741+0.20414664912262803j)
16 Execution time: 0:02:00.893009  ovlp:
(0.9350666571466457+0.21489067275948015j)
17 Execution time: 0:02:00.905574  ovlp:
(0.9258322368309211+0.2269198992237782j)
x_points = [np.float64(0.0), np.float64(0.12331317223348316),
np.float64(0.24662634446696632), np.float64(0.3699395167004495),
np.float64(0.49325268893393265), np.float64(0.6165658611674159),
np.float64(0.739879033400899), np.float64(0.8631922056343821),
np.float64(0.9865053778678653), np.float64(1.1098185501013484),
np.float64(1.2331317223348317), np.float64(1.3564448945683147),
np.float64(1.479758066801798), np.float64(1.603071239035281),
np.float64(1.7263844112687643), np.float64(1.8496975835022473),
np.float64(1.9730107557357306), np.float64(2.096323927969214)] y_points
= [1.          +0.j
0.9997211993866386+0.01396383072042751j
0.9990343978756753+0.02574145663120464j
0.9977559950631891+0.04177589190696218j
0.995430389946858 +0.05901392983064557j
0.9936147859525291+0.07380396236871722j
0.9907383796244351+0.08514638732205215j
0.9867331708129758+0.0970192134422696j
0.9831427629140783+0.11709285760428667j
0.9788043533695774+0.12563367639408796j
0.9726639398606678+0.14056650924632041j
0.9672103278627213+0.15344573758062263j
0.9621307166875768+0.16153095536810191j
0.9546847003063408+0.17967339528146953j
0.9490474879044735+0.19080501977104358j
0.9409146700122741+0.20414664912262803j
0.9350666571466457+0.21489067275948015j
0.9258322368309211+0.2269198992237782j ]
fit1: [ 0.37964246500832904 -0.30527673975005243]
[ 0.37964246500832904 -0.30527673975005243  0.37965246490832905
 -0.          ] 4.4702997296715825e-10
[ 2.6623234151824482e-01 -3.5737979294302680e-01
 2.8380829332810703e-01

```

-7.4961968060184445e-02 4.2491982980087400e-06]
4.025333000304745e-10
E_gs: -0.3573797929430268
test mps sampling took: (0.0013017654418945312, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.07314397148179008
1 Execution time: 0:02:01.301812 ovlp:
(0.9999423999078398+0.009172814676503549j)
2 Execution time: 0:02:01.303756 ovlp:
(0.9996255994009591+0.012091219345951032j)
3 Execution time: 0:02:01.306290 ovlp:
(0.9990495984793575+0.02641444226310763j)
4 Execution time: 0:02:01.309627 ovlp:
(0.9986271978035164+0.03441125505800802j)
5 Execution time: 0:02:01.313467 ovlp:
(0.9978015964825544+0.04200486720778751j)
6 Execution time: 0:02:01.318135 ovlp:
(0.9967455947929518+0.047169675471480765j)
7 Execution time: 0:02:01.324338 ovlp:
(0.9955167928268684+0.06026409642255426j)
8 Execution time: 0:02:01.331561 ovlp:
(0.9938655901849442+0.0687409099854559j)
9 Execution time: 0:02:01.339008 ovlp:
(0.9925119880191808+0.0810193296309274j)
10 Execution time: 0:02:01.346489 ovlp:
(0.9906783850854162+0.08759534015254422j)
11 Execution time: 0:02:01.354608 ovlp:
(0.988681581890531+0.09252974804759684j)
12 Execution time: 0:02:01.364346 ovlp:
(0.9864639783423654+0.10073776118041788j)
13 Execution time: 0:02:01.375695 ovlp:
(0.9841983747173995+0.10674737079579333j)
14 Execution time: 0:02:01.388755 ovlp:
(0.9813855702169123+0.12070579312926899j)
15 Execution time: 0:02:01.402855 ovlp:
(0.9782367651788242+0.12665780265248427j)
16 Execution time: 0:02:01.415596 ovlp:
(0.9764511623218597+0.13609461775138842j)
17 Execution time: 0:02:01.429096 ovlp:
(0.9729855567768908+0.13798582077731325j)
18 Execution time: 0:02:01.443820 ovlp:
(0.9705183528293646+0.14885303816486117j)
19 Execution time: 0:02:01.459937 ovlp:
(0.9662751460402337+0.15903865446184717j)
20 Execution time: 0:02:01.476410 ovlp:

```
(0.9625407400651842+0.16316666106665778j)
21 Execution time: 0:02:01.492708  ovlp:
(0.9592959348734957+0.17570428112684988j)
22 Execution time: 0:02:01.508565  ovlp:
(0.9540927265483625+0.17905468648749845j)
23 Execution time: 0:02:01.526319  ovlp:
(0.9517983228773166+0.1881939011102418j)
24 Execution time: 0:02:01.546706  ovlp:
(0.9471423154277048+0.19448191117105784j)
x_points = [np.float64(0.0), np.float64(0.07314397148179008),
np.float64(0.14628794296358016), np.float64(0.21943191444537025),
np.float64(0.29257588592716033), np.float64(0.3657198574089504),
np.float64(0.4388638288907405), np.float64(0.5120078003725306),
np.float64(0.5851517718543207), np.float64(0.6582957433361107),
np.float64(0.7314397148179008), np.float64(0.8045836862996909),
np.float64(0.877727657781481), np.float64(0.9508716292632711),
np.float64(1.0240156007450611), np.float64(1.0971595722268512),
np.float64(1.1703035437086413), np.float64(1.2434475151904314),
np.float64(1.3165914866722215), np.float64(1.3897354581540116),
np.float64(1.4628794296358016), np.float64(1.5360234011175917),
np.float64(1.6091673725993818), np.float64(1.6823113440811719),
np.float64(1.755455315562962)] y_points = [1.          +0.j
0.9999423999078398+0.00917281467650355j
0.9996255994009591+0.01209121934595103j
0.9990495984793575+0.02641444226310763j
0.9986271978035164+0.03441125505800802j
0.9978015964825544+0.04200486720778751j
0.9967455947929518+0.04716967547148077j
0.9955167928268684+0.06026409642255426j
0.9938655901849442+0.0687409099854559j
0.9925119880191808+0.0810193296309274j
0.9906783850854162+0.08759534015254422j
0.988681581890531 +0.09252974804759684j
0.9864639783423654+0.10073776118041788j
0.9841983747173995+0.10674737079579333j
0.9813855702169123+0.12070579312926899j
0.9782367651788242+0.12665780265248427j
0.9764511623218597+0.13609461775138842j
0.9729855567768908+0.13798582077731325j
0.9705183528293646+0.14885303816486117j
0.9662751460402337+0.15903865446184717j
0.9625407400651842+0.16316666106665778j
0.9592959348734957+0.17570428112684988j
0.9540927265483625+0.17905468648749845j
0.9517983228773166+0.1881939011102418j
0.9471423154277048+0.19448191117105784j]
fit1: [ 0.38494482221243614 -0.30355302254759003]
```

```

[ 0.38494482221243614 -0.30355302254759003 0.38495482211243615
 -0.          ] 9.405527107178115e-10
[ 3.1368360368560783e-01 -3.3156367686366733e-01
 2.0016870663671510e-01
 -6.5070603434140464e-02 1.7609340206355467e-06]
9.377126050246959e-10
E_gs: -0.33156367686366733
test mps sampling took: (0.0012793540954589844, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.05694279249416807
1 Execution time: 0:02:02.050147 ovlp:
(0.9999551999551999+0.006847406847406923j)
2 Execution time: 0:02:02.052038 ovlp:
(0.9997955997955998+0.01192661192661193j)
3 Execution time: 0:02:02.054605 ovlp:
(0.9994819994819995+0.019388619388619466j)
4 Execution time: 0:02:02.057915 ovlp:
(0.9990731990731991+0.025380625380625466j)
5 Execution time: 0:02:02.061794 ovlp:
(0.9985551985551986+0.03317583317583317j)
6 Execution time: 0:02:02.066398 ovlp:
(0.9979195979195978+0.040086240086240066j)
7 Execution time: 0:02:02.071721 ovlp:
(0.9971943971943973+0.04694624694624694j)
x_points = [np.float64(0.0), np.float64(0.05694279249416807),
np.float64(0.11388558498833613), np.float64(0.1708283774825042),
np.float64(0.22777116997667227), np.float64(0.28471396247084035),
np.float64(0.3416567549650084), np.float64(0.3985995474591765)]
y_points = [1.          +0.j
0.9999551999551999+0.00684740684740692j
0.9997955997955998+0.01192661192661193j
0.9994819994819995+0.01938861938861947j
0.9990731990731991+0.02538062538062547j
0.9985551985551986+0.03317583317583317j
0.9979195979195978+0.04008624008624007j
0.9971943971943973+0.04694624694624694j]
fit1: [ 0.28544131264194395 -0.42885703834877614]
[ 0.28544131264194395 -0.42885703834877614 0.28545131254194395
 -0.          ] 5.0638183321006116e-11
[ 2.4042390602357447e-01 -3.6118345565090026e-01
 2.4041840509862852e-01
 -1.4672693388550742e-01 1.5792980593410922e-06]
3.584678695779425e-11
E_gs: -0.36118345565090026
test mps sampling took: (0.0013852119445800781, Counter({2: 6, 0: 4}))

```


truncated ham size: 12 Number of fitting points: 20

shots per matrix element: 263157.0

Total gate count: 224 2 qubit gates: 120

N gate: 224 dt: 0.2172432038179189

1 Execution time: 0:02:02.497145 ovlp:

(0.9992019972867907+0.02655069027234691j)

2 Execution time: 0:02:02.499314 ovlp:

(0.9969143895089243+0.05208677709504217j)

3 Execution time: 0:02:02.502041 ovlp:

(0.9924303742632725+0.07574565753523554j)

4 Execution time: 0:02:02.505992 ovlp:

(0.9864263538496032+0.09962493872479161j)

5 Execution time: 0:02:02.510888 ovlp:

(0.9795331304126433+0.12380822094795119j)

6 Execution time: 0:02:02.517344 ovlp:

(0.9694098959936464+0.14915430712464417j)

7 Execution time: 0:02:02.524183 ovlp:

(0.9600086640294576+0.17358839020052663j)

8 Execution time: 0:02:02.530691 ovlp:

(0.9481754237964408+0.19024004681615914j)

9 Execution time: 0:02:02.538302 ovlp:

(0.9349513788346879+0.21622453516341955j)

10 Execution time: 0:02:02.546619 ovlp:

(0.9218033341313361+0.2349737989109162j)

11 Execution time: 0:02:02.556626 ovlp:

(0.9037912728903279+0.2555850689892345j)

12 Execution time: 0:02:02.568085 ovlp:

(0.8877704184194226+0.27235832601830845j)

13 Execution time: 0:02:02.579687 ovlp:

(0.8697963573076148+0.289192383254103j)

14 Execution time: 0:02:02.590574 ovlp:

(0.8512750943353207+0.30882324999905j)

15 Execution time: 0:02:02.602633 ovlp:

(0.8318646283397364+0.3128816637976568j)

16 Execution time: 0:02:02.615795 ovlp:

(0.8096117526799591+0.3272229125579027j)

17 Execution time: 0:02:02.630194 ovlp:

(0.7907864886740614+0.33700414581409577j)

18 Execution time: 0:02:02.646427 ovlp:

(0.7661320048488165+0.34962018870864164j)

19 Execution time: 0:02:02.661756 ovlp:

(0.747747542341644+0.35950782232659595j)

x_points = [np.float64(0.0), np.float64(0.2172432038179189),

np.float64(0.4344864076358378), np.float64(0.6517296114537567),

np.float64(0.8689728152716756), np.float64(1.0862160190895944),

np.float64(1.3034592229075135), np.float64(1.5207024267254323),

np.float64(1.7379456305433512), np.float64(1.95518883436127),

```
np.float64(2.172432038179189), np.float64(2.3896752419971077),
np.float64(2.606918445815027), np.float64(2.824161649632946),
np.float64(3.0414048534508646), np.float64(3.2586480572687835),
np.float64(3.4758912610867023), np.float64(3.693134464904621),
np.float64(3.91037766872254), np.float64(4.127620872540459)] y_points =
[1.          +0.j
```

```
0.9992019972867907+0.02655069027234691j
0.9969143895089243+0.05208677709504217j
0.9924303742632725+0.07574565753523554j
0.9864263538496032+0.09962493872479161j
0.9795331304126433+0.12380822094795119j
0.9694098959936464+0.14915430712464417j
0.9600086640294576+0.17358839020052663j
0.9481754237964408+0.19024004681615914j
0.9349513788346879+0.21622453516341955j
0.9218033341313361+0.2349737989109162j
0.9037912728903279+0.2555850689892345j
0.8877704184194226+0.27235832601830845j
0.8697963573076148+0.289192383254103j
0.8512750943353207+0.30882324999905j
0.8318646283397364+0.3128816637976568j
0.8096117526799591+0.3272229125579027j
0.7907864886740614+0.33700414581409577j
0.7661320048488165+0.34962018870864164j
0.747747542341644 +0.35950782232659595j]
```

```
fit1: [ 0.38300868990843645 -0.29948362920585186]
[ 0.3427487202908648 -0.31770666007551585 0.3830175629768637
-0.0180950968853556 ] 1.4949684978280106e-09
[ 0.2699688016872606 -0.35567452843604763 0.3014730920146286
-0.0647946556094144 -0.00485863104080856] 8.106855350351464e-10
E_gs: -0.35567452843604763
```

test mps sampling took: (0.001234292984008789, Counter({2: 5, 0: 5}))

truncated ham size: 12 Number of fitting points: 23

shots per matrix element: 227272.0

Total gate count: 224 2 qubit gates: 120

N gate: 224 dt: 0.13763369705221531

1 Execution time: 0:02:03.090456 ovlp:

(0.9996391988454363+0.014669646942870207j)

2 Execution time: 0:02:03.093048 ovlp:

(0.9983807948185435+0.03683691787813714j)

3 Execution time: 0:02:03.095887 ovlp:

(0.9969639902847689+0.047828153050089695j)

4 Execution time: 0:02:03.099679 ovlp:

(0.9944295821746629+0.06282340103488337j)

5 Execution time: 0:02:03.103997 ovlp:

(0.9918071737829561+0.0822274631278821j)

6 Execution time: 0:02:03.109994 ovlp:

```

(0.988093561899398+0.09763631243619986j)
7 Execution time: 0:02:03.116586 ovlp:
(0.9849343517899258+0.11303636171635745j)
8 Execution time: 0:02:03.123648 ovlp:
(0.9783783308106586+0.12451159843711501j)
9 Execution time: 0:02:03.130968 ovlp:
(0.973142314055405+0.14243725579921862j)
10 Execution time: 0:02:03.138662 ovlp:
(0.967096694709423+0.15862050758562418j)
11 Execution time: 0:02:03.147007 ovlp:
(0.9589302685768595+0.1680453377450808j)
12 Execution time: 0:02:03.156997 ovlp:
(0.9524094477102327+0.18346298708155873j)
13 Execution time: 0:02:03.167889 ovlp:
(0.9460382273223273+0.1984054348973916j)
14 Execution time: 0:02:03.178067 ovlp:
(0.9362789960927875+0.21216867893977254j)
15 Execution time: 0:02:03.191056 ovlp:
(0.9274965679890175+0.2239343165898131j)
16 Execution time: 0:02:03.203592 ovlp:
(0.9180189376606005+0.23852476327924244j)
17 Execution time: 0:02:03.216159 ovlp:
(0.908118905980499+0.24870639586046672j)
18 Execution time: 0:02:03.232012 ovlp:
(0.8984476750325601+0.2606656341300293j)
19 Execution time: 0:02:03.246469 ovlp:
(0.887782040902531+0.27360167552536163j)
20 Execution time: 0:02:03.262776 ovlp:
(0.8758228026329684+0.2821817029814495j)
21 Execution time: 0:02:03.280431 ovlp:
(0.8652715688690205+0.29115773170474135j)
22 Execution time: 0:02:03.298581 ovlp:
(0.8519483262346439+0.30226336724277525j)
x_points = [np.float64(0.0), np.float64(0.13763369705221531),
np.float64(0.27526739410443063), np.float64(0.41290109115664597),
np.float64(0.5505347882088613), np.float64(0.6881684852610765),
np.float64(0.8258021823132919), np.float64(0.9634358793655072),
np.float64(1.1010695764177225), np.float64(1.238703273469938),
np.float64(1.376336970522153), np.float64(1.5139706675743685),
np.float64(1.6516043646265839), np.float64(1.789238061678799),
np.float64(1.9268717587310145), np.float64(2.06450545578323),
np.float64(2.202139152835445), np.float64(2.33977284988766),
np.float64(2.477406546939876), np.float64(2.615040243992091),
np.float64(2.752673941044306), np.float64(2.890307638096522),
np.float64(3.027941335148737)] y_points = [1.          +0.j
0.9996391988454363+0.01466964694287021j
0.9983807948185435+0.03683691787813714j

```

0.9969639902847689+0.04782815305008969j
 0.9944295821746629+0.06282340103488337j
 0.9918071737829561+0.0822274631278821j
 0.988093561899398 +0.09763631243619986j
 0.9849343517899258+0.11303636171635745j
 0.9783783308106586+0.12451159843711501j
 0.973142314055405 +0.14243725579921862j
 0.967096694709423 +0.15862050758562418j
 0.9589302685768595+0.1680453377450808j
 0.9524094477102327+0.18346298708155873j
 0.9460382273223273+0.1984054348973916j
 0.9362789960927875+0.21216867893977254j
 0.9274965679890175+0.2239343165898131j
 0.9180189376606005+0.23852476327924244j
 0.908118905980499 +0.24870639586046672j
 0.8984476750325601+0.2606656341300293j
 0.887782040902531 +0.27360167552536163j
 0.8758228026329684+0.2821817029814495j
 0.8652715688690205+0.29115773170474135j
 0.8519483262346439+0.30226336724277525j]
 fit1: [0.3852530435777638 -0.3008635071943727]
 [0.3852530435777638 -0.3008635071943727 0.3852630434777638
 -0.] 6.731572715435916e-10
 [2.8424802768941204e-01 -3.4678295361421035e-01
 3.0175881816146860e-01
 -6.1669281131996483e-02 2.8307821518562612e-06]
 3.511683920739386e-10
 E_gs: -0.34678295361421035
 test mps sampling took: (0.001308441162109375, Counter({0: 6, 2: 4}))
 truncated ham size: 12 Number of fitting points: 8
 shots per matrix element: 714285.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.22574490228634442
 1 Execution time: 0:02:03.673903 ovlp:
 (0.999067599067599+0.028004228004228082j)
 2 Execution time: 0:02:03.675970 ovlp:
 (0.9964579964579965+0.05348425348425345j)
 3 Execution time: 0:02:03.678636 ovlp:
 (0.9918883918883918+0.07752507752507753j)
 4 Execution time: 0:02:03.681968 ovlp:
 (0.9857003857003857+0.10196910196910203j)
 5 Execution time: 0:02:03.685869 ovlp:
 (0.9775775775775777+0.12833952833952833j)
 6 Execution time: 0:02:03.690432 ovlp:
 (0.9683935683935685+0.1542507542507543j)
 7 Execution time: 0:02:03.696993 ovlp:
 (0.9564039564039564+0.17463757463757457j)

```

x_points = [np.float64(0.0), np.float64(0.22574490228634442),
np.float64(0.45148980457268884), np.float64(0.6772347068590332),
np.float64(0.9029796091453777), np.float64(1.1287245114317221),
np.float64(1.3544694137180664), np.float64(1.5802143160044109)] y_points
= [1.          +0.j
0.999067599067599 +0.02800422800422808j
0.9964579964579965+0.05348425348425345j
0.9918883918883918+0.07752507752507753j
0.9857003857003857+0.10196910196910203j
0.9775775775775777+0.12833952833952833j
0.9683935683935685+0.1542507542507543j
0.9564039564039564+0.17463757463757457j]
fit1: [ 0.3882691111461611 -0.29767028885840524]
[ 0.3882691111461611 -0.29767028885840524  0.3882791110461611
-0.          ] 2.535215509474657e-11
[ 2.8751162723866419e-01 -3.3897623547650346e-01
2.7058589718873172e-01
-6.8774378077744586e-02 -9.9999995501373941e-06]
2.7987864423233342e-11
E_gs: -0.33897623547650346
test mps sampling took: (0.0012578964233398438, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2176099870531141
1 Execution time: 0:02:04.313796 ovlp:
(0.9991136+0.022566400000000097j)
2 Execution time: 0:02:04.315673 ovlp:
(0.9966272+0.051459200000000004j)
3 Execution time: 0:02:04.318338 ovlp:
(0.9925919999999999+0.07424000000000008j)
4 Execution time: 0:02:04.321592 ovlp:
(0.9864288000000001+0.10136959999999995j)
5 Execution time: 0:02:04.325468 ovlp:
(0.9791871999999999+0.1266944000000001j)
6 Execution time: 0:02:04.330037 ovlp:
(0.9700224+0.14837440000000002j)
7 Execution time: 0:02:04.335294 ovlp:
(0.9603775999999999+0.17040959999999994j)
8 Execution time: 0:02:04.341223 ovlp: (0.9480096+0.19410560000000001j)
x_points = [np.float64(0.0), np.float64(0.2176099870531141),
np.float64(0.4352199741062282), np.float64(0.6528299611593423),
np.float64(0.8704399482124564), np.float64(1.0880499352655706),
np.float64(1.3056599223186847), np.float64(1.5232699093717987),
np.float64(1.7408798964249128)] y_points = [1.          +0.j
0.9991136          +0.02256640000000001j
0.9966272          +0.051459200000000004j

```

```

0.9925919999999999+0.07424000000000008j
0.98642880000000001+0.10136959999999995j
0.9791871999999999+0.12669440000000001j
0.9700224      +0.14837440000000002j
0.9603775999999999+0.17040959999999994j
0.9480096      +0.19410560000000001j ]
fit1: [ 0.3772995534260531 -0.30947376111426916]
[ 0.3772995534260531 -0.30947376111426916 0.3773095533260531
 -0.          ] 5.215913826629738e-11
[ 2.8145381800631075e-01 -3.4155094782193313e-01
 3.0497679649947618e-01
 -6.8034375452730875e-02 2.4476090365450579e-06]
5.202030482093475e-11
E_gs: -0.3415509478219331
test mps sampling took: (0.0012748241424560547, Counter({0: 8, 2: 2}))
truncated ham size: 12 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.04259032213597716
1 Execution time: 0:02:04.915678 ovlp:
(0.9999675999675999+0.0051894051894052495j)
2 Execution time: 0:02:04.917578 ovlp:
(0.9998703998703999+0.008317808317808373j)
3 Execution time: 0:02:04.920222 ovlp:
(0.9997371997371998+0.016630216630216577j)
4 Execution time: 0:02:04.924153 ovlp:
(0.9993951993951995+0.020381420381420323j)
5 Execution time: 0:02:04.928413 ovlp:
(0.999161199161199+0.02411102411102406j)
6 Execution time: 0:02:04.933634 ovlp:
(0.9987975987975988+0.030130230130230196j)
7 Execution time: 0:02:04.939074 ovlp:
(0.9983691983691985+0.032783432783432875j)
8 Execution time: 0:02:04.946809 ovlp:
(0.9979083979083978+0.040707040707040676j)
9 Execution time: 0:02:04.954551 ovlp:
(0.9974187974187974+0.04396864396864397j)
x_points = [np.float64(0.0), np.float64(0.04259032213597716),
np.float64(0.08518064427195432), np.float64(0.12777096640793148),
np.float64(0.17036128854390864), np.float64(0.2129516106798858),
np.float64(0.25554193281586296), np.float64(0.29813225495184015),
np.float64(0.3407225770878173), np.float64(0.3833128992237944)] y_points
= [1.          +0.j
0.9999675999675999+0.00518940518940525j
0.9998703998703999+0.00831780831780837j
0.9997371997371998+0.01663021663021658j
0.9993951993951995+0.02038142038142032j

```

```

0.999161199161199 +0.02411102411102406j
0.9987975987975988+0.0301302301302302j
0.9983691983691985+0.03278343278343288j
0.9979083979083978+0.04070704070704068j
0.9974187974187974+0.04396864396864397j]
fit1: [ 0.28289408488302165 -0.4251655825946915 ]
[ 0.28289408488302165 -0.4251655825946915  0.28290408478302165
-0.          ] 6.724397180139356e-11
[ 2.3859008084324032e-01 -3.5864262127830115e-01
2.3856214060686981e-01
-1.4221679625126948e-01  1.5688956424814218e-06]
4.401077720463537e-11
E_gs: -0.35864262127830115
test mps sampling took: (0.0012695789337158203, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.06611156999080327
1 Execution time: 0:02:05.530445 ovlp:
(0.9999375999375999+0.009378209378209323j)
2 Execution time: 0:02:05.534023 ovlp:
(0.9995735995735995+0.01868101868101868j)
3 Execution time: 0:02:05.537134 ovlp:
(0.9993655993655994+0.02326222326222327j)
4 Execution time: 0:02:05.540679 ovlp:
(0.9988819988819988+0.031920231920231856j)
5 Execution time: 0:02:05.545716 ovlp:
(0.9981435981435982+0.037884637884637806j)
6 Execution time: 0:02:05.551224 ovlp:
(0.9970827970827971+0.04692744692744699j)
7 Execution time: 0:02:05.556903 ovlp:
(0.9962871962871962+0.05291785291785289j)
8 Execution time: 0:02:05.562810 ovlp:
(0.995023595023595+0.05839865839865843j)
9 Execution time: 0:02:05.570165 ovlp:
(0.9939783939783939+0.06624546624546634j)
10 Execution time: 0:02:05.578828 ovlp:
(0.9920127920127919+0.07790907790907786j)
11 Execution time: 0:02:05.589588 ovlp:
(0.9907335907335908+0.0841386841386842j)
12 Execution time: 0:02:05.599515 ovlp:
(0.9889447889447889+0.09555789555789551j)
13 Execution time: 0:02:05.609478 ovlp:
(0.9869791869791871+0.10010790010790016j)
x_points = [np.float64(0.0), np.float64(0.06611156999080327),
np.float64(0.13222313998160654), np.float64(0.19833470997240982),
np.float64(0.26444627996321307), np.float64(0.3305578499540163),

```

```

np.float64(0.39666941994481963), np.float64(0.4627809899356229),
np.float64(0.5288925599264261), np.float64(0.5950041299172294),
np.float64(0.6611156999080327), np.float64(0.7272272698988359),
np.float64(0.7933388398896393), np.float64(0.8594504098804425)]
y_points = [1.          +0.j
0.9999375999375999+0.00937820937820932j
0.9995735995735995+0.01868101868101868j
0.9993655993655994+0.02326222326222327j
0.9988819988819988+0.03192023192023186j
0.9981435981435982+0.03788463788463781j
0.9970827970827971+0.04692744692744699j
0.9962871962871962+0.05291785291785289j
0.995023595023595 +0.05839865839865843j
0.9939783939783939+0.06624546624546634j
0.9920127920127919+0.07790907790907786j
0.9907335907335908+0.0841386841386842j
0.9889447889447889+0.09555789555789551j
0.9869791869791871+0.10010790010790016j]
fit1: [ 0.4514136441069004 -0.2598155920449784]
[ 0.4514136441069004 -0.2598155920449784  0.4514236440069004
 -0.          ] 2.7966304444209425e-10
[ 3.2639549285915137e-01 -3.2844972902876979e-01
 3.3994242104406286e-01
 -3.0248062014616529e-02  5.0714002955883933e-06]
2.4303344682022586e-10
E_gs: -0.3284497290287698
test mps sampling took: (0.0013434886932373047, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.015052164883870522
1 Execution time: 0:02:06.138785 ovlp: (1+0.0018040057728183623j)
2 Execution time: 0:02:06.141406 ovlp:
(0.9999823999436799-2.640008448029363e-05j)
3 Execution time: 0:02:06.144271 ovlp:
(0.9999735999155197+0.008448027033686412j)
4 Execution time: 0:02:06.147882 ovlp:
(0.9999471998310394+0.008527227287127292j)
5 Execution time: 0:02:06.151983 ovlp:
(0.9999383998028795+0.010146432468583821j)
6 Execution time: 0:02:06.157456 ovlp:
(0.9998679995775988+0.011686437396599691j)
7 Execution time: 0:02:06.163927 ovlp:
(0.9997623992396776+0.011096835509873726j)
8 Execution time: 0:02:06.170767 ovlp:
(0.9997183990988772+0.013411242915977395j)
9 Execution time: 0:02:06.178453 ovlp:

```



```

(0.9996919990143969+0.014132845225104829j)
10 Execution time: 0:02:06.187458 ovlp:
(0.9995511985638355+0.01862085958675075j)
11 Execution time: 0:02:06.197421 ovlp:
(0.9995863986764757+0.018814460206272754j)
12 Execution time: 0:02:06.207494 ovlp:
(0.9995247984793552+0.023724875919602928j)
13 Execution time: 0:02:06.219693 ovlp:
(0.9991991974374319+0.020935266992854418j)
14 Execution time: 0:02:06.231053 ovlp:
(0.9991903974092717+0.027324087437079703j)
15 Execution time: 0:02:06.244168 ovlp:
(0.9990495969587103+0.02544088141082046j)
16 Execution time: 0:02:06.258883 ovlp:
(0.9989439966207891+0.02845929106973144j)
17 Execution time: 0:02:06.273147 ovlp:
(0.9987503960012671+0.028124889999648017j)
18 Execution time: 0:02:06.289641 ovlp:
(0.9988119961983879+0.0323313034601711j)
19 Execution time: 0:02:06.303782 ovlp:
(0.998345594705903+0.032973705515857654j)
20 Execution time: 0:02:06.320317 ovlp:
(0.9983367946777431+0.032991305572177776j)
21 Execution time: 0:02:06.336854 ovlp:
(0.9983807948185435+0.0364849167517336j)
22 Execution time: 0:02:06.355061 ovlp:
(0.9981343940300609+0.03461931078179448j)
x_points = [np.float64(0.0), np.float64(0.015052164883870522),
np.float64(0.030104329767741043), np.float64(0.04515649465161156),
np.float64(0.06020865953548209), np.float64(0.07526082441935261),
np.float64(0.09031298930322312), np.float64(0.10536515418709365),
np.float64(0.12041731907096417), np.float64(0.13546948395483469),
np.float64(0.15052164883870522), np.float64(0.16557381372257574),
np.float64(0.18062597860644625), np.float64(0.19567814349031679),
np.float64(0.2107303083741873), np.float64(0.22578247325805784),
np.float64(0.24083463814192835), np.float64(0.25588680302579886),
np.float64(0.27093896790966937), np.float64(0.28599113279353994),
np.float64(0.30104329767741045), np.float64(0.31609546256128096),
np.float64(0.33114762744515147)] y_points = [1.
+0.0000000000000000e+00j
1.          +1.8040057728183623e-03j
0.9999823999436799-2.6400084480293629e-05j
0.9999735999155197+8.4480270336864116e-03j
0.9999471998310394+8.5272272871272925e-03j
0.9999383998028795+1.0146432468583821e-02j
0.9998679995775988+1.1686437396599691e-02j
0.9997623992396776+1.1096835509873726e-02j

```

0.9997183990988772+1.3411242915977395e-02j
 0.9996919990143969+1.4132845225104829e-02j
 0.9995511985638355+1.8620859586750749e-02j
 0.9995863986764757+1.8814460206272754e-02j
 0.9995247984793552+2.3724875919602928e-02j
 0.9991991974374319+2.0935266992854418e-02j
 0.9991903974092717+2.7324087437079703e-02j
 0.9990495969587103+2.5440881410820460e-02j
 0.9989439966207891+2.8459291069731441e-02j
 0.9987503960012671+2.8124889999648017e-02j
 0.9988119961983879+3.2331303460171101e-02j
 0.998345594705903 +3.2973705515857654e-02j
 0.9983367946777431+3.2991305572177776e-02j
 0.9983807948185435+3.6484916751733598e-02j
 0.9981343940300609+3.4619310781794477e-02j]

fit1: [0.2778251650138195 -0.41709766544868976]
 [0.2778251650138195 -0.41709766544868976 0.2778351649138195
 -0.] 3.2034282576277465e-10
 [2.3764347460431828e-01 -3.5694793900749955e-01
 2.3761503803201023e-01
 -1.2488610598012923e-01 1.4473554045518431e-06]
 3.0109053215628793e-10
 E_gs: -0.35694793900749955
 test mps sampling took: (0.0013136863708496094, Counter({0: 6, 2: 4}))
 truncated ham size: 12 Number of fitting points: 24
 shots per matrix element: 217391.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.011411256648236206

- 1 Execution time: 0:02:06.780286 ovlp: (1+0.0040618056865280305j)
- 2 Execution time: 0:02:06.782351 ovlp: (1+0.0012374017323624198j)
- 3 Execution time: 0:02:06.785632 ovlp:
(0.99999079998712+0.0001794002511603665j)
- 4 Execution time: 0:02:06.789491 ovlp:
(0.9999723999613599+0.008257011559816174j)
- 5 Execution time: 0:02:06.794260 ovlp:
(0.9999723999613599+0.007925811096135549j)
- 6 Execution time: 0:02:06.799121 ovlp:
(0.9999171998840799+0.00909421273189781j)
- 7 Execution time: 0:02:06.804668 ovlp:
(0.9998711998196796+0.008781412293977109j)
- 8 Execution time: 0:02:06.811810 ovlp:
(0.9998251997552796+0.006748209447493325j)
- 9 Execution time: 0:02:06.820879 ovlp:
(0.9998251997552796+0.010667414934380837j)
- 10 Execution time: 0:02:06.830739 ovlp:
(0.9997975997166395+0.015276621387269929j)
- 11 Execution time: 0:02:06.838874 ovlp:

```

(0.9997607996651194+0.013510218914306371j)
12 Execution time: 0:02:06.849194  ovlp:
(0.9997515996522395+0.016123022572231527j)
13 Execution time: 0:02:06.860640  ovlp:
(0.9995767994075191+0.02097142936000118j)
14 Execution time: 0:02:06.873558  ovlp:
(0.9996595995234394+0.015111021155429727j)
15 Execution time: 0:02:06.885453  ovlp:
(0.999503199304479+0.024191433868007373j)
16 Execution time: 0:02:06.899457  ovlp:
(0.999447999227199+0.022581431614004277j)
17 Execution time: 0:02:06.913137  ovlp:
(0.9992455989438385+0.02363023308232637j)
18 Execution time: 0:02:06.929432  ovlp:
(0.9992731989824786+0.023391032747445806j)
19 Execution time: 0:02:06.945091  ovlp:
(0.9991259987763983+0.024623834473368245j)
20 Execution time: 0:02:06.961498  ovlp:
(0.9989971985960779+0.02828543959961549j)
21 Execution time: 0:02:06.979353  ovlp:
(0.998987998583198+0.02719063806689337j)
22 Execution time: 0:02:06.997761  ovlp:
(0.9987119981967976+0.026298236817531517j)
23 Execution time: 0:02:07.014548  ovlp:
(0.9989051984672779+0.02859824003753597j)
x_points = [np.float64(0.0), np.float64(0.011411256648236206),
np.float64(0.02282251329647241), np.float64(0.034233769944708614),
np.float64(0.04564502659294482), np.float64(0.05705628324118103),
np.float64(0.06846753988941723), np.float64(0.07987879653765344),
np.float64(0.09129005318588965), np.float64(0.10270130983412586),
np.float64(0.11411256648236207), np.float64(0.12552382313059826),
np.float64(0.13693507977883446), np.float64(0.14834633642707068),
np.float64(0.15975759307530688), np.float64(0.1711688497235431),
np.float64(0.1825801063717793), np.float64(0.1939913630200155),
np.float64(0.2054026196682517), np.float64(0.2168138763164879),
np.float64(0.22822513296472413), np.float64(0.23963638961296033),
np.float64(0.2510476462611965), np.float64(0.26245890290943275)]
y_points = [1.          +0.j
1.          +0.00406180568652803j
1.          +0.00123740173236242j
0.99999079998712 +0.00017940025116037j
0.9999723999613599+0.00825701155981617j
0.9999723999613599+0.00792581109613555j
0.9999171998840799+0.00909421273189781j
0.9998711998196796+0.00878141229397711j
0.9998251997552796+0.00674820944749333j
0.9998251997552796+0.01066741493438084j

```

0.9997975997166395+0.01527662138726993j
 0.9997607996651194+0.01351021891430637j
 0.9997515996522395+0.01612302257223153j
 0.9995767994075191+0.02097142936000118j
 0.9996595995234394+0.01511102115542973j
 0.999503199304479 +0.02419143386800737j
 0.999447999227199 +0.02258143161400428j
 0.9992455989438385+0.02363023308232637j
 0.9992731989824786+0.02339103274744581j
 0.9991259987763983+0.02462383447336824j
 0.9989971985960779+0.02828543959961549j
 0.998987998583198 +0.02719063806689337j
 0.9987119981967976+0.02629823681753152j
 0.9989051984672779+0.02859824003753597j]

fit1: [0.48297286295900255 -0.24149922945227908]
 [0.48297286295900255 -0.24149922945227908 0.48298286285900255
 -0.] 6.829434912239984e-10
 [4.1859694755355348e-01 -2.0927209941917704e-01
 4.1864768306514233e-01
 -7.4338401074470914e-02 1.3315314665596091e-06]
 7.204245992717391e-10
 E_gs: -0.20927209941917704

test mps sampling took: (0.006051301956176758, Counter({2: 6, 0: 4}))
 truncated ham size: 12 Number of fitting points: 24
 shots per matrix element: 217391.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.19153068397759504

- 1 Execution time: 0:02:07.321905 ovlp:
(0.999539999355999+0.021210629694881522j)
- 2 Execution time: 0:02:07.323902 ovlp:
(0.9975803966125552+0.04488226283516794j)
- 3 Execution time: 0:02:07.326660 ovlp:
(0.9942407919371088+0.06973149762409658j)
- 4 Execution time: 0:02:07.330234 ovlp:
(0.9892819849947789+0.08579472011260814j)
- 5 Execution time: 0:02:07.334797 ovlp:
(0.9834399768159676+0.10981595374233533j)
- 6 Execution time: 0:02:07.340303 ovlp:
(0.9767883675037146+0.12759957863941018j)
- 7 Execution time: 0:02:07.346488 ovlp:
(0.9689775565685792+0.1515288121403371j)
- 8 Execution time: 0:02:07.353349 ovlp:
(0.9587287422202391+0.1692112368957317j)
- 9 Execution time: 0:02:07.360896 ovlp:
(0.949979529971342+0.19392247149146002j)
- 10 Execution time: 0:02:07.368866 ovlp:
(0.9375503125704376+0.21149449609229443j)

```

11 Execution time: 0:02:07.376887 ovlp:
(0.9252314953240934+0.22558891582448215j)
12 Execution time: 0:02:07.385881 ovlp:
(0.912701077781509+0.24513894319452056j)
13 Execution time: 0:02:07.397235 ovlp:
(0.89790745707044+0.26268336775671486j)
14 Execution time: 0:02:07.408551 ovlp:
(0.8803170324438454+0.276593787231302j)
15 Execution time: 0:02:07.420965 ovlp:
(0.8667654134715788+0.2927122097970938j)
16 Execution time: 0:02:07.433160 ovlp:
(0.8489265884972239+0.30345782484095474j)
17 Execution time: 0:02:07.447605 ovlp:
(0.8326149656609518+0.3176902447663428j)
18 Execution time: 0:02:07.462259 ovlp:
(0.8144265401971562+0.32520665528931736j)
19 Execution time: 0:02:07.477142 ovlp:
(0.7960909145272803+0.3361822706551789j)
20 Execution time: 0:02:07.492348 ovlp:
(0.7788868904416466+0.3470106858149602j)
21 Execution time: 0:02:07.510123 ovlp:
(0.7587664622730472+0.3551250971751361j)
22 Execution time: 0:02:07.527361 ovlp:
(0.7395476353666894+0.36277950789131097j)
23 Execution time: 0:02:07.544331 ovlp:
(0.7213592099028938+0.3674623144472402j)
x_points = [np.float64(0.0), np.float64(0.19153068397759504),
np.float64(0.3830613679551901), np.float64(0.5745920519327852),
np.float64(0.7661227359103802), np.float64(0.9576534198879751),
np.float64(1.1491841038655703), np.float64(1.3407147878431653),
np.float64(1.5322454718207603), np.float64(1.7237761557983553),
np.float64(1.9153068397759503), np.float64(2.1068375237535455),
np.float64(2.2983682077311407), np.float64(2.4898988917087355),
np.float64(2.6814295756863307), np.float64(2.8729602596639254),
np.float64(3.0644909436415206), np.float64(3.256021627619116),
np.float64(3.4475523115967106), np.float64(3.639082995574306),
np.float64(3.8306136795519006), np.float64(4.022144363529496),
np.float64(4.213675047507091), np.float64(4.405205731484686)] y_points =
[1.          +0.j
 0.999539999355999 +0.02121062969488152j
 0.9975803966125552+0.04488226283516794j
 0.9942407919371088+0.06973149762409658j
 0.9892819849947789+0.08579472011260814j
 0.9834399768159676+0.10981595374233533j
 0.9767883675037146+0.12759957863941018j
 0.9689775565685792+0.1515288121403371j
 0.9587287422202391+0.1692112368957317j

```

0.949979529971342 +0.19392247149146002j
 0.9375503125704376+0.21149449609229443j
 0.9252314953240934+0.22558891582448215j
 0.912701077781509 +0.24513894319452056j
 0.89790745707044 +0.26268336775671486j
 0.8803170324438454+0.276593787231302j
 0.8667654134715788+0.2927122097970938j
 0.8489265884972239+0.30345782484095474j
 0.8326149656609518+0.3176902447663428j
 0.8144265401971562+0.32520665528931736j
 0.7960909145272803+0.3361822706551789j
 0.7788868904416466+0.3470106858149602j
 0.7587664622730472+0.3551250971751361j
 0.7395476353666894+0.36277950789131097j
 0.7213592099028938+0.3674623144472402j]
 fit1: [0.38399313750109093 -0.2969577593762389]
 [0.30797142167371844 -0.333294998346714 0.38216355310689054
 -0.03563043486989437] 3.499808454678359e-10
 [0.2832226396632539 -0.346280485365026 0.27768398259065663
 -0.05754375248771964 -0.0063792187361733] 4.0530474052319914e-10
 E_gs: -0.346280485365026
 test mps sampling took: (0.001271963119506836, Counter({2: 6, 0: 4}))
 truncated ham size: 12 Number of fitting points: 23
 shots per matrix element: 227272.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.0670870065976964
 1 Execution time: 0:02:07.993505 ovlp:
 (0.9999383998028795+0.007937625400401327j)
 2 Execution time: 0:02:07.996250 ovlp:
 (0.9997447991833575+0.014264845647506075j)
 3 Execution time: 0:02:07.999059 ovlp:
 (0.999216797493752+0.025476081523460925j)
 4 Execution time: 0:02:08.002621 ovlp:
 (0.998732795944947+0.03434650990883181j)
 5 Execution time: 0:02:08.007746 ovlp:
 (0.9979671934950192+0.038007321623429124j)
 6 Execution time: 0:02:08.012361 ovlp:
 (0.9969639902847689+0.04735295152944485j)
 7 Execution time: 0:02:08.018736 ovlp:
 (0.9960487873561195+0.05113696363828368j)
 8 Execution time: 0:02:08.025084 ovlp:
 (0.9948343834700271+0.05662818121017987j)
 9 Execution time: 0:02:08.032237 ovlp:
 (0.9935319793023338+0.07007462423879751j)
 10 Execution time: 0:02:08.041211 ovlp:
 (0.9920447745432786+0.07626984406350101j)
 11 Execution time: 0:02:08.050361 ovlp:

```

(0.990619169981344+0.08518427258967232j)
12 Execution time: 0:02:08.059314 ovlp:
(0.9884103629131613+0.09108029145693264j)
13 Execution time: 0:02:08.070060 ovlp:
(0.9868615579569855+0.10131472420711751j)
14 Execution time: 0:02:08.080715 ovlp:
(0.9845295504945615+0.10755394417262143j)
15 Execution time: 0:02:08.093078 ovlp:
(0.9828311450596643+0.1155003696011827j)
16 Execution time: 0:02:08.104656 ovlp:
(0.9799447358231546+0.12114998767996066j)
17 Execution time: 0:02:08.118593 ovlp:
(0.9770319265021647+0.12883241226371922j)
18 Execution time: 0:02:08.131732 ovlp:
(0.9750343201098244+0.13866204371853996j)
19 Execution time: 0:02:08.147168 ovlp:
(0.9712591080291457+0.1487556760181632j)
20 Execution time: 0:02:08.162977 ovlp:
(0.968856700341441+0.1525220880706819j)
21 Execution time: 0:02:08.178014 ovlp:
(0.9662254919215743+0.16273012073638626j)
22 Execution time: 0:02:08.193392 ovlp:
(0.9622390791650532+0.16460452673448556j)
x_points = [np.float64(0.0), np.float64(0.0670870065976964),
np.float64(0.1341740131953928), np.float64(0.2012610197930892),
np.float64(0.2683480263907856), np.float64(0.335435032988482),
np.float64(0.4025220395861784), np.float64(0.4696090461838748),
np.float64(0.5366960527815712), np.float64(0.6037830593792676),
np.float64(0.670870065976964), np.float64(0.7379570725746604),
np.float64(0.8050440791723568), np.float64(0.8721310857700532),
np.float64(0.9392180923677496), np.float64(1.0063050989654458),
np.float64(1.0733921055631424), np.float64(1.1404791121608389),
np.float64(1.2075661187585351), np.float64(1.2746531253562314),
np.float64(1.341740131953928), np.float64(1.4088271385516244),
np.float64(1.4759141451493207)] y_points = [1.          +0.j
0.9999383998028795+0.00793762540040133j
0.9997447991833575+0.01426484564750607j
0.999216797493752 +0.02547608152346093j
0.998732795944947 +0.03434650990883181j
0.9979671934950192+0.03800732162342912j
0.9969639902847689+0.04735295152944485j
0.9960487873561195+0.05113696363828368j
0.9948343834700271+0.05662818121017987j
0.9935319793023338+0.07007462423879751j
0.9920447745432786+0.07626984406350101j
0.990619169981344 +0.08518427258967232j
0.9884103629131613+0.09108029145693264j

```

```

0.9868615579569855+0.10131472420711751j
0.9845295504945615+0.10755394417262143j
0.9828311450596643+0.1155003696011827j
0.9799447358231546+0.12114998767996066j
0.9770319265021647+0.12883241226371922j
0.9750343201098244+0.13866204371853996j
0.9712591080291457+0.1487556760181632j
0.968856700341441 +0.1525220880706819j
0.9662254919215743+0.16273012073638626j
0.9622390791650532+0.16460452673448556j]
fit1: [ 0.39052512559887204 -0.29838348534272013]
[ 0.39052512559887204 -0.29838348534272013 0.39053512549887204
-0.          ] 8.345017047088502e-10
[ 2.9658747276713621e-01 -3.3978017929708293e-01
3.0552742672545474e-01
-5.2485780480345204e-02 4.1190432740619943e-06]
9.037029357149921e-10
E_gs: -0.33978017929708293
test mps sampling took: (0.0012862682342529297, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.29316542242256316
1 Execution time: 0:02:08.659683 ovlp:
(0.9985584000000001+0.03440479999999999j)
2 Execution time: 0:02:08.661530 ovlp:
(0.9940096+0.06881439999999999j)
3 Execution time: 0:02:08.664595 ovlp:
(0.9865455999999999+0.101505600000000008j)
4 Execution time: 0:02:08.668130 ovlp: (0.976224+0.13298879999999999j)
x_points = [np.float64(0.0), np.float64(0.29316542242256316),
np.float64(0.5863308448451263), np.float64(0.8794962672676895),
np.float64(1.1726616896902526)] y_points = [1.          +0.j
0.9985584000000001+0.03440479999999999j
0.9940096          +0.06881439999999999j
0.9865455999999999+0.101505600000000008j
0.976224          +0.13298879999999999j ]
fit1: [ 0.3246466915339559 -0.35923528710275 ]
[ 0.3246466915339559 -0.35923528710275 0.3246566914339559
-0.          ] 2.5517037578320927e-10
[ 2.8028773554553210e-01 -3.1149683808467110e-01
2.7976615149646733e-01
-1.0686249045089692e-01 1.3876404868547983e-06]
1.0362365790580559e-10
E_gs: -0.3114968380846711
test mps sampling took: (0.0013470649719238281, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 12

```



```

shots per matrix element: 454545.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2603404288671425
1 Execution time: 0:02:09.282034 ovlp:
(0.9988691988691989+0.03226743226743234j)
2 Execution time: 0:02:09.284320 ovlp:
(0.9952787952787954+0.06290026290026285j)
3 Execution time: 0:02:09.287093 ovlp:
(0.9892111892111892+0.08963908963908973j)
4 Execution time: 0:02:09.291024 ovlp:
(0.9813307813307812+0.11801471801471797j)
5 Execution time: 0:02:09.295576 ovlp:
(0.9706167706167705+0.146953546953547j)
6 Execution time: 0:02:09.300252 ovlp:
(0.9584199584199584+0.17664917664917668j)
7 Execution time: 0:02:09.306458 ovlp:
(0.9431299431299431+0.20068640068640065j)
8 Execution time: 0:02:09.313166 ovlp:
(0.927100727100727+0.222066022066022j)
9 Execution time: 0:02:09.320420 ovlp:
(0.9081279081279081+0.24792924792924786j)
10 Execution time: 0:02:09.327714 ovlp:
(0.8891022891022891+0.270945670945671j)
11 Execution time: 0:02:09.336750 ovlp:
(0.8668558668558668+0.2912296912296912j)
x_points = [np.float64(0.0), np.float64(0.2603404288671425),
np.float64(0.520680857734285), np.float64(0.7810212866014274),
np.float64(1.04136171546857), np.float64(1.3017021443357124),
np.float64(1.562042573202855), np.float64(1.8223830020699974),
np.float64(2.08272343093714), np.float64(2.3430638598042823),
np.float64(2.603404288671425), np.float64(2.8637447175385673)] y_points
= [1.          +0.j
0.9988691988691989+0.03226743226743234j
0.9952787952787954+0.06290026290026285j
0.9892111892111892+0.08963908963908973j
0.9813307813307812+0.11801471801471797j
0.9706167706167705+0.146953546953547j
0.9584199584199584+0.17664917664917668j
0.9431299431299431+0.20068640068640065j
0.927100727100727 +0.222066022066022j
0.9081279081279081+0.24792924792924786j
0.8891022891022891+0.270945670945671j
0.8668558668558668+0.2912296912296912j ]
fit1: [ 0.3799730050179405 -0.3041457460839041]
[ 0.3799730050179405 -0.3041457460839041 0.3799830049179405
-0.          ] 1.4786325026287262e-10
[ 2.7706779531787218e-01 -3.5017670625233860e-01

```

2.9597445056342153e-01
-6.6091806384419444e-02 2.1439789632237202e-06]
9.914517187408819e-11
E_gs: -0.3501767062523386
test mps sampling took: (0.001323699951171875, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.20056961345535906
1 Execution time: 0:02:09.794341 ovlp:
(0.9992731989824786+0.02409943373920731j)
2 Execution time: 0:02:09.796283 ovlp:
(0.9973227962519147+0.0470442658619723j)
3 Execution time: 0:02:09.798862 ovlp:
(0.9934587908423071+0.06860909605273458j)
4 Execution time: 0:02:09.802084 ovlp:
(0.9878283829597361+0.08987032581845611j)
5 Execution time: 0:02:09.807041 ovlp:
(0.9823267752574854+0.1143423600793041j)
6 Execution time: 0:02:09.813009 ovlp:
(0.9738903634465088+0.13402118762966264j)
7 Execution time: 0:02:09.819377 ovlp:
(0.9650767511074516+0.15516281722794423j)
8 Execution time: 0:02:09.825988 ovlp:
(0.9560147384206339+0.17890805047127056j)
9 Execution time: 0:02:09.832938 ovlp:
(0.9438155213417299+0.19935047909067083j)
10 Execution time: 0:02:09.840653 ovlp:
(0.9319199046878666+0.21926850697590972j)
11 Execution time: 0:02:09.850655 ovlp:
(0.9175586845821584+0.2339425275195386j)
12 Execution time: 0:02:09.861449 ovlp:
(0.904053065674292+0.25392495549493765j)
13 Execution time: 0:02:09.871120 ovlp:
(0.8888546443965022+0.27155218017305227j)
14 Execution time: 0:02:09.882487 ovlp:
(0.8707306190228665+0.28800180320252444j)
15 Execution time: 0:02:09.894419 ovlp:
(0.8543453960835545+0.30441462618047654j)
16 Execution time: 0:02:09.907459 ovlp:
(0.8365525711735997+0.31405623967873564j)
17 Execution time: 0:02:09.922224 ovlp:
(0.8187321462250048+0.32239145134803193j)
18 Execution time: 0:02:09.937315 ovlp:
(0.7992281189193664+0.33492186889061637j)
19 Execution time: 0:02:09.950874 ovlp:
(0.7757772860882006+0.3426314796840715j)

```

20 Execution time: 0:02:09.968357  ovlp:
(0.759732463625449+0.35561269785777694j)
21 Execution time: 0:02:09.984889  ovlp:
(0.7382964336150071+0.3629175080845113j)
22 Execution time: 0:02:10.001852  ovlp:
(0.7186820061548087+0.36674471344259874j)
23 Execution time: 0:02:10.021596  ovlp:
(0.6976783767497274+0.3679131150783612j)
x_points = [np.float64(0.0), np.float64(0.20056961345535906),
np.float64(0.4011392269107181), np.float64(0.6017088403660772),
np.float64(0.8022784538214363), np.float64(1.0028480672767954),
np.float64(1.2034176807321544), np.float64(1.4039872941875133),
np.float64(1.6045569076428725), np.float64(1.8051265210982317),
np.float64(2.005696134553591), np.float64(2.2062657480089496),
np.float64(2.4068353614643088), np.float64(2.607404974919668),
np.float64(2.8079745883750267), np.float64(3.008544201830386),
np.float64(3.209113815285745), np.float64(3.409683428741104),
np.float64(3.6102530421964634), np.float64(3.810822655651822),
np.float64(4.011392269107182), np.float64(4.21196188256254),
np.float64(4.412531496017899), np.float64(4.613101109473258)] y_points =
[1.          +0.j
0.9992731989824786+0.02409943373920731j
0.9973227962519147+0.0470442658619723j
0.9934587908423071+0.06860909605273458j
0.9878283829597361+0.08987032581845611j
0.9823267752574854+0.1143423600793041j
0.9738903634465088+0.13402118762966264j
0.9650767511074516+0.15516281722794423j
0.9560147384206339+0.17890805047127056j
0.9438155213417299+0.19935047909067083j
0.9319199046878666+0.21926850697590972j
0.9175586845821584+0.2339425275195386j
0.904053065674292 +0.25392495549493765j
0.8888546443965022+0.27155218017305227j
0.8707306190228665+0.28800180320252444j
0.8543453960835545+0.30441462618047654j
0.8365525711735997+0.31405623967873564j
0.8187321462250048+0.32239145134803193j
0.7992281189193664+0.33492186889061637j
0.7757772860882006+0.3426314796840715j
0.759732463625449 +0.35561269785777694j
0.7382964336150071+0.3629175080845113j
0.7186820061548087+0.36674471344259874j
0.6976783767497274+0.3679131150783612j ]
fit1: [ 0.38025363131151335 -0.29902698998653987]
[ 0.3146024703073962 -0.3308165304498299  0.37720578983241654
-0.03197200368631769] 5.890672942858458e-10

```

```

[ 0.3026331835464667 -0.3364439592638024 0.2659972785958004
 -0.05039112567351343 -0.00273631475301116] 5.695432207028969e-10
E_gs: -0.3364439592638024
test mps sampling took: (0.0012960433959960938, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.28788748958444127
1 Execution time: 0:02:10.439490 ovlp:
(0.998548+0.035384000000000008j)
2 Execution time: 0:02:10.441526 ovlp:
(0.993932+0.065547999999999994j)
3 Execution time: 0:02:10.444323 ovlp: (0.98690799999999999+0.096576j)
4 Execution time: 0:02:10.447528 ovlp: (0.9774+0.132368000000000004j)
5 Execution time: 0:02:10.451392 ovlp:
(0.96408399999999999+0.162408000000000001j)
6 Execution time: 0:02:10.455824 ovlp:
(0.949348000000000001+0.192312000000000004j)
7 Execution time: 0:02:10.461095 ovlp:
(0.93107199999999999+0.220336000000000001j)
8 Execution time: 0:02:10.467000 ovlp:
(0.911144+0.245835999999999994j)
9 Execution time: 0:02:10.473453 ovlp: (0.888892+0.26989599999999999j)
10 Execution time: 0:02:10.480600 ovlp:
(0.866084000000000001+0.290852000000000001j)
x_points = [np.float64(0.0), np.float64(0.28788748958444127),
np.float64(0.5757749791688825), np.float64(0.8636624687533239),
np.float64(1.151549958337765), np.float64(1.4394374479222063),
np.float64(1.7273249375066477), np.float64(2.0152124270910887),
np.float64(2.30309991667553), np.float64(2.5909874062599716),
np.float64(2.8788748958444126)] y_points = [1.          +0.j
0.998548          +0.035384000000000008j
0.993932          +0.065547999999999994j
0.98690799999999999+0.096576j
0.9774           +0.132368000000000004j
0.96408399999999999+0.162408000000000001j
0.949348000000000001+0.192312000000000004j
0.93107199999999999+0.220336000000000001j
0.911144         +0.245835999999999994j
0.888892         +0.26989599999999999j
0.866084000000000001+0.290852000000000001j ]
fit1: [ 0.38318271940755216 -0.3016457456217576 ]
[ 0.38318271940755216 -0.3016457456217576 0.38319271930755217
 -0.          ] 5.104409186074459e-11
[ 3.0128889018449873e-01 -3.3655503983108365e-01
2.3354094787719668e-01
-6.3795867312106444e-02 3.7087032430353846e-06]

```

3.7821481874545194e-11
E_gs: -0.33655503983108365
test mps sampling took: (0.0013430118560791016, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.14088941983787856
1 Execution time: 0:02:10.920582 ovlp:
(0.9996240000000001+0.018088000000000104j)
2 Execution time: 0:02:10.923268 ovlp:
(0.998656+0.03145599999999993j)
3 Execution time: 0:02:10.926159 ovlp:
(0.9967520000000001+0.04738400000000009j)
4 Execution time: 0:02:10.929626 ovlp:
(0.9943839999999999+0.06786399999999992j)
5 Execution time: 0:02:10.933837 ovlp:
(0.9914480000000001+0.08153600000000005j)
6 Execution time: 0:02:10.938458 ovlp:
(0.9874320000000001+0.09920799999999996j)
7 Execution time: 0:02:10.943675 ovlp:
(0.9823919999999999+0.11083200000000004j)
8 Execution time: 0:02:10.950483 ovlp: (0.977776+0.13198400000000001j)
9 Execution time: 0:02:10.958013 ovlp: (0.97156+0.14304000000000006j)
10 Execution time: 0:02:10.967022 ovlp:
(0.9659279999999999+0.15559199999999995j)
11 Execution time: 0:02:10.977316 ovlp:
(0.9578800000000001+0.17449599999999998j)
12 Execution time: 0:02:10.988561 ovlp:
(0.950968+0.18499200000000005j)
13 Execution time: 0:02:11.000867 ovlp:
(0.9430320000000001+0.19843199999999994j)
14 Execution time: 0:02:11.013691 ovlp:
(0.933616+0.21739200000000003j)
15 Execution time: 0:02:11.025759 ovlp: (0.923816+0.230448j)
16 Execution time: 0:02:11.038390 ovlp: (0.914472+0.2421279999999999j)
17 Execution time: 0:02:11.052565 ovlp:
(0.9051119999999999+0.25160800000000005j)
18 Execution time: 0:02:11.067894 ovlp:
(0.8927039999999999+0.2632239999999999j)
19 Execution time: 0:02:11.083762 ovlp: (0.88388+0.27583200000000001j)
20 Execution time: 0:02:11.100963 ovlp:
(0.869904+0.28559200000000007j)
x_points = [np.float64(0.0), np.float64(0.14088941983787856),
np.float64(0.2817788396757571), np.float64(0.4226682595136357),
np.float64(0.5635576793515142), np.float64(0.7044470991893927),
np.float64(0.8453365190272714), np.float64(0.98622593886515),
np.float64(1.1271153587030285), np.float64(1.268004778540907),

```

np.float64(1.4088941983787855), np.float64(1.5497836182166642),
np.float64(1.6906730380545427), np.float64(1.8315624578924212),
np.float64(1.9724518777303), np.float64(2.1133412975681782),
np.float64(2.254230717406057), np.float64(2.3951201372439357),
np.float64(2.536009557081814), np.float64(2.6768989769196927),
np.float64(2.817788396757571)] y_points = [1.          +0.j
0.9996240000000001+0.0180880000000001j
0.998656          +0.03145599999999993j
0.9967520000000001+0.04738400000000009j
0.9943839999999999+0.06786399999999992j
0.9914480000000001+0.08153600000000005j
0.9874320000000001+0.09920799999999996j
0.9823919999999999+0.11083200000000004j
0.977776          +0.13198400000000001j
0.97156          +0.14304000000000006j
0.9659279999999999+0.15559199999999995j
0.9578800000000001+0.17449599999999998j
0.950968          +0.18499200000000005j
0.9430320000000001+0.19843199999999994j
0.933616          +0.21739200000000003j
0.923816          +0.230448j
0.914472          +0.24212799999999999j
0.9051119999999999+0.25160800000000005j
0.8927039999999999+0.2632239999999999j
0.88388          +0.27583200000000001j
0.869904          +0.28559200000000007j]
fit1: [ 0.38271355177170285 -0.30223436512737945]
[ 0.38271355177170285 -0.30223436512737945  0.38272355167170286
-0.          ] 3.881917973485829e-10
[ 2.8807052300058877e-01 -3.4568341554056148e-01
3.0145226929267344e-01
-5.6229994002647020e-02  2.1466337290324665e-06]
2.9258823587513694e-10
E_gs: -0.3456834155405615
test mps sampling took: (0.0012924671173095703, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.11636874662984542
1 Execution time: 0:02:11.500351 ovlp:
(0.9997755995063189+0.014215431273948864j)
2 Execution time: 0:02:11.502204 ovlp:
(0.9992519983543964+0.0310454683000303j)
3 Execution time: 0:02:11.504723 ovlp:
(0.9977899951379894+0.038736285219827415j)
4 Execution time: 0:02:11.508462 ovlp:
(0.9959675911287005+0.05300271660597655j)

```

```

5 Execution time: 0:02:11.512800  ovlp:
(0.9942403873288521+0.06670474675044291j)
6 Execution time: 0:02:11.518142  ovlp:
(0.9916223815692395+0.08154917940819462j)
7 Execution time: 0:02:11.523811  ovlp:
(0.988426374538024+0.09321120506465119j)
8 Execution time: 0:02:11.529660  ovlp:
(0.9847611664745664+0.10546483202263035j)
9 Execution time: 0:02:11.536207  ovlp:
(0.980606357333986+0.1195884630946189j)
10 Execution time: 0:02:11.543507  ovlp:
(0.9767167487768473+0.13148848927467638j)
11 Execution time: 0:02:11.551609  ovlp:
(0.9714195371229817+0.14342931554449412j)
12 Execution time: 0:02:11.560100  ovlp:
(0.9657143245715141+0.1588925495636091j)
13 Execution time: 0:02:11.570665  ovlp:
(0.9603219127082079+0.16988817375398235j)
14 Execution time: 0:02:11.581592  ovlp:
(0.9535762978678552+0.18626940979270157j)
15 Execution time: 0:02:11.592415  ovlp:
(0.9471910838203843+0.19391262660777864j)
16 Execution time: 0:02:11.603798  ovlp:
(0.9407582696681933+0.20552025214455472j)
17 Execution time: 0:02:11.615753  ovlp:
(0.9329654525239957+0.2131906690194718j)
x_points = [np.float64(0.0), np.float64(0.11636874662984542),
np.float64(0.23273749325969084), np.float64(0.34910623988953626),
np.float64(0.4654749865193817), np.float64(0.5818437331492271),
np.float64(0.6982124797790725), np.float64(0.814581226408918),
np.float64(0.9309499730387634), np.float64(1.047318719668609),
np.float64(1.1636874662984542), np.float64(1.2800562129282995),
np.float64(1.396424959558145), np.float64(1.5127937061879906),
np.float64(1.629162452817836), np.float64(1.7455311994476812),
np.float64(1.8618999460775267), np.float64(1.9782686927073723)] y_points
= [1.          +0.j
0.9997755995063189+0.01421543127394886j
0.9992519983543964+0.0310454683000303j
0.9977899951379894+0.03873628521982742j
0.9959675911287005+0.05300271660597655j
0.9942403873288521+0.06670474675044291j
0.9916223815692395+0.08154917940819462j
0.988426374538024 +0.09321120506465119j
0.9847611664745664+0.10546483202263035j
0.980606357333986 +0.1195884630946189j
0.9767167487768473+0.13148848927467638j
0.9714195371229817+0.14342931554449412j

```

0.9657143245715141+0.1588925495636091j
0.9603219127082079+0.16988817375398235j
0.9535762978678552+0.18626940979270157j
0.9471910838203843+0.19391262660777864j
0.9407582696681933+0.20552025214455472j
0.9329654525239957+0.2131906690194718j]
fit1: [0.3843137936754673 -0.3032757231246253]
[0.3843137936754673 -0.3032757231246253 0.3843237935754673
-0.] 3.8129379737072573e-10
[2.6384975852626286e-01 -3.5930875367295845e-01
2.9329019653968891e-01
-7.6822121684398295e-02 8.1432759691231095e-06]
3.3098699378187e-10
E_gs: -0.35930875367295845
test mps sampling took: (0.0013065338134765625, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.05502705364124283
1 Execution time: 0:02:12.045708 ovlp:
(0.9999327998924799+0.009268814830103667j)
2 Execution time: 0:02:12.047560 ovlp:
(0.9998655997849597+0.01137121819394915j)
3 Execution time: 0:02:12.050200 ovlp:
(0.9995103992166388+0.018273629237806732j)
4 Execution time: 0:02:12.053369 ovlp:
(0.9992511988019182+0.02394723831558121j)
5 Execution time: 0:02:12.057120 ovlp:
(0.9985983977574364+0.02944804711687543j)
6 Execution time: 0:02:12.061590 ovlp:
(0.998079996927995+0.03903846246153986j)
7 Execution time: 0:02:12.066705 ovlp:
(0.9973503957606331+0.04664167462667934j)
8 Execution time: 0:02:12.072430 ovlp:
(0.9966207945932712+0.049425679081086527j)
9 Execution time: 0:02:12.080060 ovlp:
(0.9956895931033489+0.05936169497871191j)
10 Execution time: 0:02:12.088523 ovlp:
(0.9944607911372658+0.06180969889551813j)
11 Execution time: 0:02:12.096558 ovlp:
(0.9941151905843049+0.07409771855634961j)
12 Execution time: 0:02:12.105125 ovlp:
(0.9920607872972598+0.07741932387091821j)
13 Execution time: 0:02:12.114241 ovlp:
(0.9910335856537371+0.08049132878612597j)
14 Execution time: 0:02:12.124232 ovlp:
(0.9896991835186937+0.08478253565205707j)

15 Execution time: 0:02:12.134832 ovlp:
(0.9882015811225298+0.09285614856983782j)
16 Execution time: 0:02:12.146955 ovlp:
(0.9860703777126043+0.10074736119577787j)
17 Execution time: 0:02:12.161189 ovlp:
(0.9843903750246001+0.10668017068827318j)
18 Execution time: 0:02:12.174611 ovlp:
(0.9826335722137156+0.11264178022684845j)
19 Execution time: 0:02:12.188524 ovlp:
(0.9812991700786722+0.11835378936606289j)
20 Execution time: 0:02:12.204790 ovlp:
(0.9788991662386659+0.1273010036816058j)
21 Execution time: 0:02:12.219800 ovlp:
(0.9771327634124214+0.13377141403426251j)
22 Execution time: 0:02:12.237844 ovlp:
(0.9740991585586536+0.13812982100771354j)
23 Execution time: 0:02:12.255875 ovlp:
(0.9724095558552894+0.14388983022372837j)
24 Execution time: 0:02:12.273407 ovlp:
(0.9694719511551217+0.1486514378423005j)
x_points = [np.float64(0.0), np.float64(0.05502705364124283),
np.float64(0.11005410728248566), np.float64(0.1650811609237285),
np.float64(0.22010821456497132), np.float64(0.27513526820621415),
np.float64(0.330162321847457), np.float64(0.3851893754886998),
np.float64(0.44021642912994263), np.float64(0.49524348277118546),
np.float64(0.5502705364124283), np.float64(0.6052975900536711),
np.float64(0.660324643694914), np.float64(0.7153516973361568),
np.float64(0.7703787509773996), np.float64(0.8254058046186424),
np.float64(0.8804328582598853), np.float64(0.9354599119011281),
np.float64(0.9904869655423709), np.float64(1.0455140191836136),
np.float64(1.1005410728248566), np.float64(1.1555681264660995),
np.float64(1.2105951801073422), np.float64(1.265622233748585),
np.float64(1.320649287389828)] y_points = [1. +0.j
0.9999327998924799+0.00926881483010367j
0.9998655997849597+0.01137121819394915j
0.9995103992166388+0.01827362923780673j
0.9992511988019182+0.02394723831558121j
0.9985983977574364+0.02944804711687543j
0.998079996927995 +0.03903846246153986j
0.9973503957606331+0.04664167462667934j
0.9966207945932712+0.04942567908108653j
0.9956895931033489+0.05936169497871191j
0.9944607911372658+0.06180969889551813j
0.9941151905843049+0.07409771855634961j
0.9920607872972598+0.07741932387091821j
0.9910335856537371+0.08049132878612597j
0.9896991835186937+0.08478253565205707j

```

0.9882015811225298+0.09285614856983782j
0.9860703777126043+0.10074736119577787j
0.9843903750246001+0.10668017068827318j
0.9826335722137156+0.11264178022684845j
0.9812991700786722+0.11835378936606289j
0.9788991662386659+0.1273010036816058j
0.9771327634124214+0.13377141403426251j
0.9740991585586536+0.13812982100771354j
0.9724095558552894+0.14388983022372837j
0.9694719511551217+0.1486514378423005j ]
fit1: [ 0.38812111206124744 -0.29936600455992923]
[ 0.38812111206124744 -0.29936600455992923 0.38813111196124744
-0.          ] 3.9346870940786367e-10
[ 3.0072209658121196e-01 -3.1665122082769165e-01
3.0047653387122442e-01
-7.0443337834088723e-02 2.9368865072546525e-06]
6.484696232942654e-10
E_gs: -0.31665122082769165
test mps sampling took: (0.0012996196746826172, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.23400142907127103
1 Execution time: 0:02:12.959146 ovlp:
(0.9990111996044799+0.028093211237284477j)
2 Execution time: 0:02:12.961214 ovlp:
(0.9961359984543994+0.055160422064168824j)
3 Execution time: 0:02:12.963970 ovlp:
(0.9915255966102385+0.08096763238705296j)
4 Execution time: 0:02:12.968949 ovlp:
(0.9843471937388775+0.10510684204273679j)
5 Execution time: 0:02:12.974479 ovlp:
(0.9758247903299162+0.1336284534513814j)
6 Execution time: 0:02:12.985837 ovlp:
(0.9652071860828744+0.15756846302738525j)
x_points = [np.float64(0.0), np.float64(0.23400142907127103),
np.float64(0.46800285814254206), np.float64(0.702004287213813),
np.float64(0.9360057162850841), np.float64(1.1700071453563552),
np.float64(1.404008574427626)] y_points = [1.          +0.j
0.9990111996044799+0.02809321123728448j
0.9961359984543994+0.05516042206416882j
0.9915255966102385+0.08096763238705296j
0.9843471937388775+0.10510684204273679j
0.9758247903299162+0.1336284534513814j
0.9652071860828744+0.15756846302738525j]
fit1: [ 0.39654554074302056 -0.29164738182105304]
[ 0.39654554074302056 -0.29164738182105304 0.39655554064302057

```

```

-0.          ] 2.2393813915707728e-11
[ 3.166915450507714e-01 -3.231448531518539e-01 3.161955194141099e-01
-4.148836089006320e-02 4.625071514539753e-06]
2.8542899577370774e-11
E_gs: -0.3231448531518539
test mps sampling took: (0.001298666000366211, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.05157694969347616
1 Execution time: 0:02:13.650169 ovlp:
(0.9999743999999999+0.007187199999999949j)
2 Execution time: 0:02:13.652107 ovlp:
(0.9998400000000001+0.01344640000000008j)
3 Execution time: 0:02:13.654684 ovlp:
(0.9996864000000001+0.021081600000000034j)
4 Execution time: 0:02:13.658513 ovlp:
(0.9992255999999999+0.021126399999999999j)
5 Execution time: 0:02:13.662759 ovlp:
(0.9988032+0.031884800000000004j)
6 Execution time: 0:02:13.667983 ovlp:
(0.9983424000000001+0.036607999999999974j)
7 Execution time: 0:02:13.673737 ovlp:
(0.9976640000000001+0.040627200000000085j)
8 Execution time: 0:02:13.679646 ovlp:
(0.9969536000000001+0.0463616j)
9 Execution time: 0:02:13.686600 ovlp:
(0.9961792+0.0545408000000000056j)
10 Execution time: 0:02:13.694007 ovlp:
(0.9952832+0.058246400000000003j)
11 Execution time: 0:02:13.702281 ovlp:
(0.994496+0.066137600000000002j)
12 Execution time: 0:02:13.711962 ovlp: (0.9935232+0.071264j)
13 Execution time: 0:02:13.722622 ovlp:
(0.9921408+0.077088000000000005j)
14 Execution time: 0:02:13.734127 ovlp:
(0.9905215999999999+0.083449600000000001j)
15 Execution time: 0:02:13.744896 ovlp:
(0.9891904+0.08877439999999992j)
16 Execution time: 0:02:13.756674 ovlp:
(0.9871551999999999+0.09206399999999992j)
x_points = [np.float64(0.0), np.float64(0.05157694969347616),
np.float64(0.10315389938695232), np.float64(0.1547308490804285),
np.float64(0.20630779877390465), np.float64(0.2578847484673808),
np.float64(0.309461698160857), np.float64(0.36103864785433315),
np.float64(0.4126155975478093), np.float64(0.46419254724128545),
np.float64(0.5157694969347616), np.float64(0.5673464466282377),

```

```

np.float64(0.618923396321714), np.float64(0.6705003460151902),
np.float64(0.7220772957086663), np.float64(0.7736542454021424),
np.float64(0.8252311950956186)] y_points = [1.          +0.j
0.9999743999999999+0.007187199999999995j
0.9998400000000001+0.013446400000000008j
0.9996864000000001+0.021081600000000003j
0.9992255999999999+0.021126399999999999j
0.9988032          +0.031884800000000005j
0.9983424000000001+0.036607999999999997j
0.9976640000000001+0.040627200000000009j
0.9969536000000001+0.0463616j
0.9961792          +0.054540800000000006j
0.9952832          +0.058246400000000003j
0.994496           +0.066137600000000002j
0.9935232          +0.071264j
0.9921408          +0.077088000000000005j
0.9905215999999999+0.083449600000000001j
0.9891904          +0.088774399999999992j
0.9871551999999999+0.092063999999999992j]
fit1: [ 0.31853893501748387 -0.3635059910528027 ]
[ 0.31853893501748387 -0.3635059910528027  0.3185489349174839
-0.          ] 1.346053985146188e-10
[ 2.7414109975545065e-01 -3.1418654434604854e-01
2.7356829024578161e-01
-1.0753885311889948e-01  1.4194120543842235e-06]
1.9280999349040542e-10
E_gs: -0.31418654434604854
test mps sampling took: (0.0012743473052978516, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.19919855912807888
1 Execution time: 0:02:14.287482 ovlp:
(0.999328+0.02226599999999999897j)
2 Execution time: 0:02:14.289436 ovlp:
(0.9972639999999999+0.0465800000000000066j)
3 Execution time: 0:02:14.292147 ovlp:
(0.9937940000000001+0.068038000000000004j)
4 Execution time: 0:02:14.296102 ovlp:
(0.988794+0.091504000000000003j)
5 Execution time: 0:02:14.300462 ovlp: (0.982604+0.114317999999999992j)
x_points = [np.float64(0.0), np.float64(0.19919855912807888),
np.float64(0.39839711825615776), np.float64(0.5975956773842366),
np.float64(0.7967942365123155), np.float64(0.9959927956403944)]
y_points = [1.          +0.j
0.999328          +0.022265999999999999j
0.9972639999999999+0.046580000000000007j

```

```

0.9937940000000001+0.06803800000000004j
0.988794      +0.09150400000000003j
0.982604      +0.11431799999999992j]
fit1: [ 0.4488896808130483 -0.2617607780182822]
[ 0.4488896808130483 -0.2617607780182822  0.4488996807130483
 -0.          ] 4.21585770613275e-11
[ 3.8261023062607225e-01 -2.3013152191481154e-01
 3.8328470941284548e-01
 -7.4406553920177018e-02  1.5657535943966472e-06]
1.032280961574125e-09
E_gs: -0.23013152191481154
test mps sampling took: (0.0014393329620361328, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.2882750542510156
1 Execution time: 0:02:15.137581 ovlp:
(0.9986368000000001+0.03250559999999991j)
2 Execution time: 0:02:15.139587 ovlp:
(0.9941424000000001+0.06847359999999991j)
3 Execution time: 0:02:15.142277 ovlp: (0.9870112+0.1008384j)
4 Execution time: 0:02:15.147227 ovlp: (0.9765248+0.13162880000000001j)
x_points = [np.float64(0.0), np.float64(0.2882750542510156),
np.float64(0.5765501085020313), np.float64(0.8648251627530469),
np.float64(1.1531002170040625)] y_points = [1.          +0.j
0.9986368000000001+0.03250559999999991j
0.9941424000000001+0.06847359999999991j
0.9870112      +0.1008384j
0.9765248      +0.13162880000000001j ]
fit1: [ 0.3229015108250122 -0.3626823093440281]
[ 0.3229015108250122 -0.3626823093440281  0.3229115107250122
 -0.          ] 2.3292205694658543e-10
[ 2.7377417455946651e-01 -3.0904360069604037e-01
 2.7320830433828880e-01
 -1.2073914352780017e-01  1.5463236309938101e-06]
1.4272157433216747e-10
E_gs: -0.30904360069604037
test mps sampling took: (0.0012552738189697266, Counter({0: 7, 2: 3}))
truncated ham size: 12 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.16394780404510653
1 Execution time: 0:02:15.844231 ovlp:
(0.9995211995211994+0.019735819735819726j)
2 Execution time: 0:02:15.846201 ovlp:
(0.9982695982695984+0.037896637896637886j)
3 Execution time: 0:02:15.848776 ovlp:

```

(0.9955647955647955+0.05766185766185772j)
4 Execution time: 0:02:15.852236 ovlp:
(0.9922803922803922+0.07793107793107801j)
5 Execution time: 0:02:15.856103 ovlp:
(0.9872487872487872+0.09526029526029522j)
6 Execution time: 0:02:15.860572 ovlp:
(0.9833175833175833+0.11365631365631357j)
7 Execution time: 0:02:15.865887 ovlp:
(0.9762363762363762+0.13102753102753106j)
8 Execution time: 0:02:15.871747 ovlp:
(0.9695919695919697+0.15195195195195188j)
9 Execution time: 0:02:15.878168 ovlp:
(0.9632919632919632+0.1653415653415653j)
10 Execution time: 0:02:15.885373 ovlp:
(0.9551523551523551+0.18036918036918026j)
11 Execution time: 0:02:15.893279 ovlp:
(0.9451059451059451+0.2000756000756001j)
12 Execution time: 0:02:15.901750 ovlp:
(0.935101535101535+0.21492681492681487j)
13 Execution time: 0:02:15.910876 ovlp:
(0.9233751233751233+0.23072723072723078j)
14 Execution time: 0:02:15.920798 ovlp:
(0.9114555114555114+0.2453936453936454j)
15 Execution time: 0:02:15.933320 ovlp:
(0.8996450996450998+0.2596568596568596j)
16 Execution time: 0:02:15.944979 ovlp:
(0.8867510867510868+0.2732816732816732j)
17 Execution time: 0:02:15.957226 ovlp:
(0.8732102732102731+0.28486528486528484j)
18 Execution time: 0:02:15.970096 ovlp:
(0.8603414603414603+0.29416409416409417j)
19 Execution time: 0:02:15.983459 ovlp:
(0.8445242445242445+0.3093681093681093j)
20 Execution time: 0:02:15.997982 ovlp:
(0.8308826308826309+0.3207081207081206j)
21 Execution time: 0:02:16.012636 ovlp:
(0.8133014133014134+0.32689892689892686j)
x_points = [np.float64(0.0), np.float64(0.16394780404510653),
np.float64(0.32789560809021306), np.float64(0.49184341213531957),
np.float64(0.6557912161804261), np.float64(0.8197390202255327),
np.float64(0.9836868242706391), np.float64(1.1476346283157457),
np.float64(1.3115824323608523), np.float64(1.4755302364059588),
np.float64(1.6394780404510654), np.float64(1.803425844496172),
np.float64(1.9673736485412783), np.float64(2.131321452586385),
np.float64(2.2952692566314914), np.float64(2.459217060676598),
np.float64(2.6231648647217045), np.float64(2.787112668766811),
np.float64(2.9510604728119176), np.float64(3.115008276857024),

```

np.float64(3.2789560809021308), np.float64(3.442903884947237)] y_points
= [1.          +0.j
0.9995211995211994+0.01973581973581973j
0.9982695982695984+0.03789663789663789j
0.9955647955647955+0.05766185766185772j
0.9922803922803922+0.07793107793107801j
0.9872487872487872+0.09526029526029522j
0.9833175833175833+0.11365631365631357j
0.9762363762363762+0.13102753102753106j
0.9695919695919697+0.15195195195195188j
0.9632919632919632+0.1653415653415653j
0.9551523551523551+0.18036918036918026j
0.9451059451059451+0.2000756000756001j
0.935101535101535 +0.21492681492681487j
0.9233751233751233+0.23072723072723078j
0.9114555114555114+0.2453936453936454j
0.8996450996450998+0.2596568596568596j
0.8867510867510868+0.2732816732816732j
0.8732102732102731+0.28486528486528484j
0.8603414603414603+0.29416409416409417j
0.8445242445242445+0.3093681093681093j
0.8308826308826309+0.3207081207081206j
0.8133014133014134+0.32689892689892686j]
fit1: [ 0.3836859783261511 -0.30050073290786244]
[ 0.3836859783261511 -0.30050073290786244  0.3836959782261511
 -0.          ] 4.77924980291563e-10
[ 2.6648708154662692e-01 -3.5433437520154776e-01
 2.9281994705689152e-01
 -7.7466409148522111e-02  3.3779320846777426e-06]
1.6441725265709227e-10
E_gs: -0.35433437520154776
test mps sampling took: (0.0013043880462646484, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.22402689976230006
1 Execution time: 0:02:16.434242 ovlp:
(0.9991119985791976+0.026491242385987768j)
2 Execution time: 0:02:16.436208 ovlp:
(0.9964095942553508+0.05008808014092825j)
3 Execution time: 0:02:16.438991 ovlp:
(0.9920943873510197+0.0800449280718849j)
4 Execution time: 0:02:16.442184 ovlp:
(0.9857439771903636+0.10351696562714507j)
5 Execution time: 0:02:16.446189 ovlp:
(0.9782031651250642+0.1258082012931221j)
6 Execution time: 0:02:16.452250 ovlp:

```

```

(0.9686415498264798+0.15379224606759379j)
7 Execution time: 0:02:16.457895 ovlp:
(0.9572895316632506+0.174984279974848j)
8 Execution time: 0:02:16.464363 ovlp:
(0.944569511311218+0.19875871801394873j)
9 Execution time: 0:02:16.472199 ovlp:
(0.9317198907518252+0.21747394795831676j)
10 Execution time: 0:02:16.480272 ovlp:
(0.9148046636874618+0.24156038649661848j)
11 Execution time: 0:02:16.488908 ovlp:
(0.8991374386199018+0.2589124142598629j)
12 Execution time: 0:02:16.498880 ovlp:
(0.8805422088675341+0.2767876428602285j)
x_points = [np.float64(0.0), np.float64(0.22402689976230006),
np.float64(0.4480537995246001), np.float64(0.6720806992869002),
np.float64(0.8961075990492002), np.float64(1.1201344988115003),
np.float64(1.3441613985738003), np.float64(1.5681882983361004),
np.float64(1.7922151980984005), np.float64(2.0162420978607005),
np.float64(2.2402689976230006), np.float64(2.4642958973853006),
np.float64(2.6883227971476007)] y_points = [1.          +0.j
0.9991119985791976+0.02649124238598777j
0.9964095942553508+0.05008808014092825j
0.9920943873510197+0.0800449280718849j
0.9857439771903636+0.10351696562714507j
0.9782031651250642+0.1258082012931221j
0.9686415498264798+0.15379224606759379j
0.9572895316632506+0.174984279974848j
0.944569511311218 +0.19875871801394873j
0.9317198907518252+0.21747394795831676j
0.9148046636874618+0.24156038649661848j
0.8991374386199018+0.2589124142598629j
0.8805422088675341+0.2767876428602285j ]
fit1: [ 0.38255595564391126 -0.30316264267675397]
[ 0.38255595564391126 -0.30316264267675397 0.38256595554391126
-0.          ] 6.653360502388529e-11
[ 2.9275409612405207e-01 -3.4252694193660110e-01
2.9527573241391669e-01
-5.5438771111624000e-02 2.3040943450968656e-06]
5.1820818023826235e-11
E_gs: -0.3425269419366011
test mps sampling took: (0.0015952587127685547, Counter({2: 7, 0: 3}))
truncated ham size: 12 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.27048818285815196
1 Execution time: 0:02:16.987055 ovlp:
(0.9986307986307987+0.032019432019432026j)

```



```

2 Execution time: 0:02:16.990077 ovlp:
(0.9948003948003947+0.061103061103061185j)
3 Execution time: 0:02:16.992767 ovlp:
(0.9883043883043883+0.0941486941486942j)
4 Execution time: 0:02:16.996087 ovlp:
(0.9793107793107794+0.12220192220192216j)
5 Execution time: 0:02:17.001092 ovlp:
(0.9676851676851677+0.15162715162715168j)
6 Execution time: 0:02:17.006256 ovlp:
(0.9547547547547548+0.1815983815983817j)
7 Execution time: 0:02:17.011521 ovlp:
(0.9384811384811385+0.2082236082236082j)
x_points = [np.float64(0.0), np.float64(0.27048818285815196),
np.float64(0.5409763657163039), np.float64(0.8114645485744558),
np.float64(1.0819527314326078), np.float64(1.3524409142907599),
np.float64(1.6229290971489116), np.float64(1.8934172800070637)] y_points
= [1.          +0.j
0.9986307986307987+0.03201943201943203j
0.9948003948003947+0.06110306110306118j
0.9883043883043883+0.0941486941486942j
0.9793107793107794+0.12220192220192216j
0.9676851676851677+0.15162715162715168j
0.9547547547547548+0.1815983815983817j
0.9384811384811385+0.2082236082236082j ]
fit1: [ 0.3952446741926214 -0.2931069903963751]
[ 0.3952446741926214 -0.2931069903963751 0.3952546740926214
-0.          ] 2.5873076527187145e-11
[ 2.8685503170764182e-01 -3.4540933924255846e-01
2.9277861307559189e-01
-5.8124132274458562e-02 4.2541337310605164e-06]
9.563744462636717e-12
E_gs: -0.34540933924255846
test mps sampling took: (0.001329660415649414, Counter({2: 5, 0: 5}))
truncated ham size: 12 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.1276705554331172
1 Execution time: 0:02:17.558123 ovlp:
(0.9997419997419998+0.016353016353016336j)
2 Execution time: 0:02:17.560874 ovlp:
(0.9987819987819988+0.029649029649029712j)
3 Execution time: 0:02:17.563711 ovlp:
(0.9973779973779975+0.04281904281904292j)
4 Execution time: 0:02:17.567585 ovlp:
(0.9957099957099957+0.055251055251055226j)
5 Execution time: 0:02:17.572405 ovlp:
(0.9930639930639931+0.07131907131907123j)

```

```

6 Execution time: 0:02:17.577099  ovlp:
(0.9895179895179895+0.09044109044109039j)
7 Execution time: 0:02:17.583660  ovlp:
(0.986115986115986+0.1058851058851058j)
8 Execution time: 0:02:17.589889  ovlp:
(0.9817359817359816+0.11714111714111719j)
9 Execution time: 0:02:17.597560  ovlp:
(0.976923976923977+0.1335091335091334j)
10 Execution time: 0:02:17.606133  ovlp:
(0.9707019707019706+0.14415314415314406j)
11 Execution time: 0:02:17.616623  ovlp:
(0.9656739656739657+0.15901515901515895j)
12 Execution time: 0:02:17.627204  ovlp:
(0.95993195993196+0.16695916695916702j)
13 Execution time: 0:02:17.637841  ovlp:
(0.9522819522819523+0.18437718437718442j)
14 Execution time: 0:02:17.647908  ovlp:
(0.9448299448299449+0.19461919461919464j)
15 Execution time: 0:02:17.658611  ovlp:
(0.9375819375819376+0.21011121011121014j)
x_points = [np.float64(0.0), np.float64(0.1276705554331172),
np.float64(0.2553411108662344), np.float64(0.38301166629935157),
np.float64(0.5106822217324688), np.float64(0.638352777165586),
np.float64(0.7660233325987031), np.float64(0.8936938880318204),
np.float64(1.0213644434649376), np.float64(1.1490349988980548),
np.float64(1.276705554331172), np.float64(1.4043761097642893),
np.float64(1.5320466651974063), np.float64(1.6597172206305235),
np.float64(1.7873877760636407), np.float64(1.915058331496758)] y_points =
[1.          +0.j
0.9997419997419998+0.01635301635301634j
0.9987819987819988+0.02964902964902971j
0.9973779973779975+0.04281904281904292j
0.9957099957099957+0.05525105525105523j
0.9930639930639931+0.07131907131907123j
0.9895179895179895+0.09044109044109039j
0.986115986115986 +0.1058851058851058j
0.9817359817359816+0.11714111714111719j
0.976923976923977 +0.1335091335091334j
0.9707019707019706+0.14415314415314406j
0.9656739656739657+0.15901515901515895j
0.95993195993196 +0.16695916695916702j
0.9522819522819523+0.18437718437718442j
0.9448299448299449+0.19461919461919464j
0.9375819375819376+0.21011121011121014j]
fit1: [ 0.37897530024203585 -0.3052279159506829 ]
[ 0.37897530024203585 -0.3052279159506829  0.37898530014203585
-0.          ] 4.1512085738945233e-10

```

[2.7713523976987658e-01 -3.5264816944171518e-01
 3.0663218357107325e-01
 -5.9706126196067390e-02 6.3455268624841656e-06]
 3.813555570487923e-10
 E_gs: -0.3526481694417152
 test mps sampling took: (0.001291513442993164, Counter({2: 7, 0: 3}))
 truncated ham size: 12 Number of fitting points: 18
 shots per matrix element: 294117.0
 Total gate count: 224 2 qubit gates: 120
 N gate: 224 dt: 0.22324385377886058
 1 Execution time: 0:02:18.065364 ovlp:
 (0.9991363981000758+0.026333057932727444j)
 2 Execution time: 0:02:18.067265 ovlp:
 (0.996457192205823+0.05143191315020901j)
 3 Execution time: 0:02:18.070492 ovlp:
 (0.9922411829306024+0.077877171329777j)
 4 Execution time: 0:02:18.074052 ovlp:
 (0.986148369526413+0.10225522496149497j)
 5 Execution time: 0:02:18.078314 ovlp:
 (0.9777911511405326+0.12808848179465993j)
 6 Execution time: 0:02:18.082922 ovlp:
 (0.9683459303610469+0.15010693023524646j)
 7 Execution time: 0:02:18.088905 ovlp:
 (0.9579147074123564+0.17426738338824355j)
 8 Execution time: 0:02:18.095662 ovlp:
 (0.945667880469337+0.2001142402513285j)
 9 Execution time: 0:02:18.102871 ovlp:
 (0.930163846360462+0.21928348242366136j)
 10 Execution time: 0:02:18.110194 ovlp:
 (0.9165298163655959+0.23744632238190921j)
 11 Execution time: 0:02:18.119157 ovlp:
 (0.8990197778435112+0.25828836823441015j)
 12 Execution time: 0:02:18.128796 ovlp:
 (0.881176538588385+0.27628120781865717j)
 13 Execution time: 0:02:18.138183 ovlp:
 (0.8634420995726191+0.2920912426007338j)
 14 Execution time: 0:02:18.149704 ovlp:
 (0.8432528551562812+0.30784007724817j)
 15 Execution time: 0:02:18.160894 ovlp:
 (0.8215064073140961+0.32184130805087774j)
 16 Execution time: 0:02:18.172291 ovlp:
 (0.8026703658748049+0.33580173876382524j)
 17 Execution time: 0:02:18.184420 ovlp:
 (0.7815155193341425+0.34428135741898624j)
 x_points = [np.float64(0.0), np.float64(0.22324385377886058),
 np.float64(0.44648770755772116), np.float64(0.6697315613365817),
 np.float64(0.8929754151154423), np.float64(1.116219268894303),

```

np.float64(1.3394631226731635), np.float64(1.562706976452024),
np.float64(1.7859508302308846), np.float64(2.009194684009745),
np.float64(2.232438537788606), np.float64(2.4556823915674664),
np.float64(2.678926245346327), np.float64(2.9021700991251875),
np.float64(3.125413952904048), np.float64(3.3486578066829087),
np.float64(3.5719016604617693), np.float64(3.79514551424063)] y_points =
[1.          +0.j
 0.9991363981000758+0.02633305793272744j
 0.996457192205823 +0.05143191315020901j
 0.9922411829306024+0.077877171329777j
 0.986148369526413 +0.10225522496149497j
 0.9777911511405326+0.12808848179465993j
 0.9683459303610469+0.15010693023524646j
 0.9579147074123564+0.17426738338824355j
 0.945667880469337 +0.2001142402513285j
 0.930163846360462 +0.21928348242366136j
 0.9165298163655959+0.23744632238190921j
 0.8990197778435112+0.25828836823441015j
 0.881176538588385 +0.27628120781865717j
 0.8634420995726191+0.2920912426007338j
 0.8432528551562812+0.30784007724817j
 0.8215064073140961+0.32184130805087774j
 0.8026703658748049+0.33580173876382524j
 0.7815155193341425+0.34428135741898624j]
fit1: [ 0.3829160153868454 -0.29960279463774364]
[ 0.3829160153868454 -0.29960279463774364 0.3829260152868454
 -0.          ] 6.90790033992808e-10
[ 2.8889338140201259e-01 -3.4317460748290651e-01
 2.9244588961179480e-01
 -6.0719520220086212e-02 2.3687874988050064e-06]
6.533067764103842e-11
E_gs: -0.3431746074829065
test mps sampling took: (0.0012733936309814453, Counter({0: 5, 2: 5}))
truncated ham size: 12 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.26781087123048086
1 Execution time: 0:02:18.591040 ovlp: (0.99872+0.029015999999999993j)
2 Execution time: 0:02:18.593443 ovlp:
(0.9945759999999999+0.060632000000000002j)
3 Execution time: 0:02:18.596252 ovlp:
(0.9890159999999999+0.09079199999999998j)
4 Execution time: 0:02:18.600001 ovlp:
(0.980064+0.118840000000000006j)
5 Execution time: 0:02:18.604827 ovlp:
(0.96899200000000001+0.150392000000000008j)
6 Execution time: 0:02:18.610136 ovlp:

```

```

(0.9555199999999999+0.17749600000000001j)
7 Execution time: 0:02:18.615626  ovlp:
(0.93967200000000001+0.20845599999999997j)
8 Execution time: 0:02:18.622474  ovlp: (0.922512+0.2323679999999999j)
9 Execution time: 0:02:18.630670  ovlp:
(0.9028879999999999+0.25675200000000001j)
10 Execution time: 0:02:18.639341  ovlp:
(0.882312+0.27892000000000006j)
11 Execution time: 0:02:18.649180  ovlp:
(0.86134400000000001+0.2931839999999999j)
12 Execution time: 0:02:18.659284  ovlp:
(0.8367199999999999+0.3120879999999999j)
13 Execution time: 0:02:18.669867  ovlp:
(0.80956000000000001+0.3251839999999999j)
14 Execution time: 0:02:18.682117  ovlp:
(0.784584+0.34284800000000004j)
15 Execution time: 0:02:18.693213  ovlp: (0.75587200000000001+0.353448j)
16 Execution time: 0:02:18.704692  ovlp:
(0.72899200000000001+0.36695999999999995j)
17 Execution time: 0:02:18.716597  ovlp:
(0.704208+0.36807999999999996j)
18 Execution time: 0:02:18.729543  ovlp: (0.679344+0.37443200000000001j)
19 Execution time: 0:02:18.742931  ovlp: (0.649392+0.37752800000000001j)
20 Execution time: 0:02:18.757020  ovlp:
(0.620808+0.37737599999999993j)
x_points = [np.float64(0.0), np.float64(0.26781087123048086),
np.float64(0.5356217424609617), np.float64(0.8034326136914426),
np.float64(1.0712434849219235), np.float64(1.3390543561524044),
np.float64(1.6068652273828852), np.float64(1.874676098613366),
np.float64(2.142486969843847), np.float64(2.410297841074328),
np.float64(2.678108712304809), np.float64(2.9459195835352894),
np.float64(3.2137304547657704), np.float64(3.4815413259962513),
np.float64(3.749352197226732), np.float64(4.017163068457213),
np.float64(4.284973939687694), np.float64(4.552784810918174),
np.float64(4.820595682148656), np.float64(5.088406553379136),
np.float64(5.356217424609618)] y_points = [1.          +0.j
0.99872          +0.029015999999999993j
0.9945759999999999+0.060632000000000002j
0.9890159999999999+0.09079199999999998j
0.980064          +0.118840000000000006j
0.96899200000000001+0.150392000000000008j
0.9555199999999999+0.17749600000000001j
0.93967200000000001+0.20845599999999997j
0.922512          +0.2323679999999999j
0.9028879999999999+0.25675200000000001j
0.882312          +0.27892000000000006j
0.86134400000000001+0.2931839999999999j

```

```

0.8367199999999999+0.3120879999999999j
0.8095600000000001+0.3251839999999999j
0.784584      +0.34284800000000004j
0.7558720000000001+0.353448j
0.7289920000000001+0.36695999999999995j
0.704208      +0.36807999999999996j
0.679344      +0.3744320000000001j
0.649392      +0.3775280000000001j
0.620808      +0.37737599999999993j]
fit1: [ 0.3809821414999588 -0.2962693378626409]
[ 0.3176592224942881 -0.32785036517784855  0.38098673352056933
 -0.03093971108144916] 1.248158364108404e-09
[ 3.0315299226765563e-01 -3.3430373355264492e-01
 2.7852746043305443e-01
 -5.3088272806359242e-02 -2.4445471891411266e-04]
1.1213194297302508e-09
E_gs: -0.3343037335526449
test mps sampling took: (0.0012664794921875, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.24543869393774004
1 Execution time: 0:02:19.141052  ovlp:
(0.998912+0.0284819999999999896j)
2 Execution time: 0:02:19.143025  ovlp:
(0.9957579999999999+0.05776200000000009j)
3 Execution time: 0:02:19.145659  ovlp: (0.990632+0.08526799999999999j)
4 Execution time: 0:02:19.148953  ovlp: (0.983072+0.11143999999999998j)
5 Execution time: 0:02:19.152741  ovlp: (0.974246+0.13830600000000004j)
x_points = [np.float64(0.0), np.float64(0.24543869393774004),
np.float64(0.4908773878754801), np.float64(0.7363160818132202),
np.float64(0.9817547757509602), np.float64(1.2271934696887001)] y_points
= [1.      +0.j
 0.998912      +0.02848199999999999j
 0.9957579999999999+0.05776200000000009j
 0.990632      +0.08526799999999999j
 0.983072      +0.11143999999999998j
 0.974246      +0.13830600000000004j]
fit1: [ 0.3395396362534661 -0.3408434768522953]
[ 0.3395396362534661 -0.3408434768522953  0.3395496361534661
 -0.      ] 8.972230296401994e-11
[ 2.6403217677436847e-01 -3.2211090802968728e-01
 2.7896818400218876e-01
 -1.1136377162330202e-01  7.8402894988886366e-06]
6.579737081194598e-11
E_gs: -0.3221109080296873
test mps sampling took: (0.001295328140258789, Counter({0: 6, 2: 4}))

```

truncated ham size: 12 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.29874079992990143
1 Execution time: 0:02:19.834656 ovlp:
(0.9984775951283045+0.03887852441127815j)
2 Execution time: 0:02:19.836627 ovlp:
(0.9935759794431342+0.06591221091907484j)
3 Execution time: 0:02:19.839161 ovlp:
(0.9862279559294589+0.10293392938857404j)
4 Execution time: 0:02:19.842470 ovlp:
(0.9752543208138267+0.13672603752332013j)
5 Execution time: 0:02:19.846312 ovlp:
(0.9610774754479214+0.1684325389841248j)
6 Execution time: 0:02:19.850853 ovlp:
(0.9443838220282306+0.1954398254074412j)
7 Execution time: 0:02:19.857104 ovlp:
(0.9255693618219578+0.2268735259952832j)
8 Execution time: 0:02:19.864006 ovlp:
(0.9050828962652679+0.25396881270020066j)
9 Execution time: 0:02:19.871325 ovlp:
(0.8803020169664544+0.2776584885071631j)
10 Execution time: 0:02:19.879719 ovlp:
(0.854007532824105+0.299702559048189j)
11 Execution time: 0:02:19.888776 ovlp:
(0.8296666549332958+0.3183762188039001j)
12 Execution time: 0:02:19.897568 ovlp:
(0.7980305536977719+0.33228906332500263j)
13 Execution time: 0:02:19.907006 ovlp:
(0.7724664718927101+0.34715231088739484j)
14 Execution time: 0:02:19.916978 ovlp:
(0.7387359639550846+0.36121475588721874j)
15 Execution time: 0:02:19.927610 ovlp:
(0.7099070717026295+0.36631877222007114j)
16 Execution time: 0:02:19.938977 ovlp:
(0.6815269808863389+0.3742035974515119j)
17 Execution time: 0:02:19.953081 ovlp:
(0.6521876870005985+0.3766764053644971j)
18 Execution time: 0:02:19.966155 ovlp:
(0.6187651800485761+0.37695800626562015j)
19 Execution time: 0:02:19.979819 ovlp:
(0.5911066915414129+0.37255799218557506j)
20 Execution time: 0:02:19.996089 ovlp:
(0.5616617973177513+0.37170438945404616j)
21 Execution time: 0:02:20.010947 ovlp:
(0.5424337357879545+0.36087155478897537j)
22 Execution time: 0:02:20.026475 ovlp:

```

(0.5152240487169559+0.3536643317258614j)
x_points = [np.float64(0.0), np.float64(0.29874079992990143),
np.float64(0.5974815998598029), np.float64(0.8962223997897043),
np.float64(1.1949631997196057), np.float64(1.4937039996495072),
np.float64(1.7924447995794086), np.float64(2.09118559950931),
np.float64(2.3899263994392115), np.float64(2.688667199369113),
np.float64(2.9874079992990143), np.float64(3.286148799228916),
np.float64(3.584889599158817), np.float64(3.8836303990887187),
np.float64(4.18237119901862), np.float64(4.4811119989485215),
np.float64(4.779852798878423), np.float64(5.078593598808324),
np.float64(5.377334398738226), np.float64(5.676075198668127),
np.float64(5.974815998598029), np.float64(6.27355679852793),
np.float64(6.572297598457832)] y_points = [1.          +0.j
0.9984775951283045+0.03887852441127815j
0.9935759794431342+0.06591221091907484j
0.9862279559294589+0.10293392938857404j
0.9752543208138267+0.13672603752332013j
0.9610774754479214+0.1684325389841248j
0.9443838220282306+0.1954398254074412j
0.9255693618219578+0.2268735259952832j
0.9050828962652679+0.25396881270020066j
0.8803020169664544+0.2776584885071631j
0.854007532824105 +0.299702559048189j
0.8296666549332958+0.3183762188039001j
0.7980305536977719+0.33228906332500263j
0.7724664718927101+0.34715231088739484j
0.7387359639550846+0.36121475588721874j
0.7099070717026295+0.36631877222007114j
0.6815269808863389+0.3742035974515119j
0.6521876870005985+0.3766764053644971j
0.6187651800485761+0.37695800626562015j
0.5911066915414129+0.37255799218557506j
0.5616617973177513+0.37170438945404616j
0.5424337357879545+0.36087155478897537j
0.5152240487169559+0.3536643317258614j ]
fit1: [ 0.3777695591086887 -0.29151501705737415]
[ 0.2884759027653909 -0.34126831311026007 0.3769681592451445
-0.04967783410471941] 7.969335407457592e-09
[ 0.2765959022518034 -0.34579249110007815 0.2861238371264683
-0.07347787173441776 -0.0010757720131788 ] 6.337375783889759e-09
E_gs: -0.34579249110007815
test mps sampling took: (0.0013537406921386719, Counter({2: 6, 0: 4}))
truncated ham size: 12 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.0696664459810435
1 Execution time: 0:02:20.515870 ovlp:

```



```

(0.9999271998252797+0.005588813413152094j)
2 Execution time: 0:02:20.518201  ovlp:
(0.9997087993011182+0.01742724182538047j)
3 Execution time: 0:02:20.520948  ovlp:
(0.9991767980243154+0.025340060816146037j)
4 Execution time: 0:02:20.524215  ovlp:
(0.9987231969356727+0.03234567762962626j)
5 Execution time: 0:02:20.528135  ovlp:
(0.9978663948793478+0.03824249178198036j)
6 Execution time: 0:02:20.532638  ovlp:
(0.996858392460142+0.049156917976603154j)
7 Execution time: 0:02:20.539103  ovlp:
(0.9955871894092545+0.05479053149727564j)
8 Execution time: 0:02:20.545497  ovlp:
(0.9945455869094086+0.06296095110628275j)
9 Execution time: 0:02:20.552322  ovlp:
(0.9929047829714792+0.0743905785373884j)
10 Execution time: 0:02:20.559537  ovlp:
(0.9915495797189913+0.08007459217902113j)
11 Execution time: 0:02:20.567481  ovlp:
(0.9899423758617021+0.08649220758129816j)
12 Execution time: 0:02:20.576177  ovlp:
(0.9879599711039306+0.10008904021369647j)
13 Execution time: 0:02:20.585730  ovlp:
(0.9847959635103125+0.10555465333116798j)
14 Execution time: 0:02:20.595667  ovlp:
(0.9837655610373466+0.11196666872000494j)
x_points = [np.float64(0.0), np.float64(0.0696664459810435),
np.float64(0.139332891962087), np.float64(0.20899933794313053),
np.float64(0.278665783924174), np.float64(0.3483322299052175),
np.float64(0.41799867588626105), np.float64(0.48766512186730454),
np.float64(0.557331567848348), np.float64(0.6269980138293916),
np.float64(0.696664459810435), np.float64(0.7663309057914786),
np.float64(0.8359973517725221), np.float64(0.9056637977535655),
np.float64(0.9753302437346091)] y_points = [1.          +0.j
0.9999271998252797+0.00558881341315209j
0.9997087993011182+0.01742724182538047j
0.9991767980243154+0.02534006081614604j
0.9987231969356727+0.03234567762962626j
0.9978663948793478+0.03824249178198036j
0.996858392460142 +0.04915691797660315j
0.9955871894092545+0.05479053149727564j
0.9945455869094086+0.06296095110628275j
0.9929047829714792+0.0743905785373884j
0.9915495797189913+0.08007459217902113j
0.9899423758617021+0.08649220758129816j
0.9879599711039306+0.10008904021369647j

```

```

0.9847959635103125+0.10555465333116798j
0.9837655610373466+0.11196666872000494j]
fit1: [ 0.3667761962418554 -0.3197262936082591]
[ 0.3667761962418554 -0.3197262936082591 0.3667861961418554
-0.          ] 1.5777680741048936e-10
[ 2.7187297767402030e-01 -3.4817466065752228e-01
3.0408553359471197e-01
-7.3785160500460856e-02 3.4979717878102891e-06]
1.405383359267136e-10
E_gs: -0.3481746606575223
test mps sampling took: (0.001306295394897461, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.16745141969286764
1 Execution time: 0:02:21.128724  ovlp:
(0.9994959991935988+0.02145123432197482j)
2 Execution time: 0:02:21.130762  ovlp:
(0.9981135969817552+0.04098726557962484j)
3 Execution time: 0:02:21.133396  ovlp:
(0.9955359928575886+0.060979297566876145j)
4 Execution time: 0:02:21.136781  ovlp:
(0.9915807865292585+0.07864812583700131j)
5 Execution time: 0:02:21.141775  ovlp:
(0.9875727801164482+0.09769935631897009j)
6 Execution time: 0:02:21.147239  ovlp:
(0.9818319709311536+0.115195384312615j)
7 Execution time: 0:02:21.153504  ovlp:
(0.9753279605247369+0.13464981543970467j)
8 Execution time: 0:02:21.160577  ovlp:
(0.9679599487359181+0.15221784354854972j)
9 Execution time: 0:02:21.167989  ovlp:
(0.9599391359026175+0.16771226833962927j)
10 Execution time: 0:02:21.175656  ovlp:
(0.9518703229925167+0.18537149659439445j)
11 Execution time: 0:02:21.184607  ovlp:
(0.9422559076094521+0.20366432586292138j)
12 Execution time: 0:02:21.194806  ovlp:
(0.9319262910820658+0.21788674861879787j)
x_points = [np.float64(0.0), np.float64(0.16745141969286764),
np.float64(0.3349028393857353), np.float64(0.502354259078603),
np.float64(0.6698056787714706), np.float64(0.8372570984643382),
np.float64(1.004708518157206), np.float64(1.1721599378500736),
np.float64(1.3396113575429411), np.float64(1.5070627772358087),
np.float64(1.6745141969286763), np.float64(1.8419656166215441),
np.float64(2.009417036314412)] y_points = [1.          +0.j
0.9994959991935988+0.02145123432197482j

```

```

0.9981135969817552+0.04098726557962484j
0.9955359928575886+0.06097929756687614j
0.9915807865292585+0.07864812583700131j
0.9875727801164482+0.09769935631897009j
0.9818319709311536+0.115195384312615j
0.9753279605247369+0.13464981543970467j
0.9679599487359181+0.15221784354854972j
0.9599391359026175+0.16771226833962927j
0.9518703229925167+0.18537149659439445j
0.9422559076094521+0.20366432586292138j
0.9319262910820658+0.21788674861879787j]
fit1: [ 0.38318984177082654 -0.30357672814641784]
[ 0.38318984177082654 -0.30357672814641784 0.38319984167082655
-0.          ] 6.445357715754725e-11
[ 2.8799978432494455e-01 -3.4311506027191313e-01
2.8801890037911027e-01
-6.3643209832610764e-02 3.8821850299794222e-06]
6.272260526524316e-11
E_gs: -0.34311506027191313
test mps sampling took: (0.001232147216796875, Counter({0: 6, 2: 4}))
truncated ham size: 12 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 224 2 qubit gates: 120
N gate: 224 dt: 0.29042516672733104
1 Execution time: 0:02:21.763213  ovlp:
(0.9985280000000001+0.034977999999999954j)
2 Execution time: 0:02:21.765257  ovlp:
(0.9941279999999999+0.06787600000000005j)
3 Execution time: 0:02:21.767899  ovlp:
(0.9865600000000001+0.09895800000000001j)
4 Execution time: 0:02:21.771076  ovlp: (0.976218+0.13156199999999996j)
5 Execution time: 0:02:21.774874  ovlp: (0.9635720000000001+0.166026j)
x_points = [np.float64(0.0), np.float64(0.29042516672733104),
np.float64(0.5808503334546621), np.float64(0.8712755001819932),
np.float64(1.1617006669093242), np.float64(1.4521258336366552)] y_points
= [1.          +0.j
0.9985280000000001+0.03497799999999995j
0.9941279999999999+0.06787600000000005j
0.9865600000000001+0.09895800000000001j
0.976218          +0.13156199999999996j
0.9635720000000001+0.166026j          ]
fit1: [ 0.3878330568895043 -0.3003131319239879]
[ 0.3878330568895043 -0.3003131319239879 0.3878430567895043
-0.          ] 1.5550514444071398e-11
[ 2.9945257129312219e-01 -3.3641405977305511e-01
3.1204638419617586e-01
-5.1160150195860690e-02 2.2111866497808342e-06]

```

[illegible]

```

    res=miner(n_qubits, ham, repeats, 5, X_file, Y_file,
generate_hyper_params_avqe, wrapper_avqe, compress_avqe)
    Resolving package versions...
    No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
    No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
    Resolving package versions...
    No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
    No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
test mps sampling took: (24.653517246246338, Counter({2: 9, 0: 1}))
/usr/local/lib/python3.10/site-packages/stopit/__init__.py:10: UserWarning:
pkg_resources is deprecated as an API. See https://setuptools.pypa.io/en/
latest/pkg_resources.html. The pkg_resources package is slated for removal as
early as 2025-11-30. Refrain from using this package or pin to Setuptools<81.
    import pkg_resources
>> Start Stage 1
>> Read ham ../hamiltonian/, 06qubits_05.data
06qubits_05
>> Start processing: 06qubits_05.data with qubits 6
>> Running Miner
>>>> adding ham of size 16
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)

```

iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18

θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)

iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUDED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUDED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUDED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)

iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]

QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)

iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list

QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
 QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
 iteration: 3
 selected second largest gradient
 index 11 added to ignored list
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 3
 new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
 index 11 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18

θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3

selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18

θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5

new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
θ: [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
θ: [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)

iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list

QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18

θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18

θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5

new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
θ: [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]

index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list

new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18

θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)

iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUDED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUDED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUDED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUDED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2

new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 6

new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
θ: [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]

QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient

index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
θ: [0.]

index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list

QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient

index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2

new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]

index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.1195282339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]

index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient

index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.1195282339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18

θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')

θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18

θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)

iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)

iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.1195282339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18

θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list

QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)

iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUDED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUDED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUDED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18

θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)

iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3

selected second largest gradient
 index 11 added to ignored list
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 5
 new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
 index 17 added to ignored list
 QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
 QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
 iteration: 3
 selected second largest gradient
 index 11 added to ignored list
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 3

new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2

new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)

iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]

index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]

index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]

index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 5
 new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
 index 17 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
 QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
 iteration: 3
 selected second largest gradient
 index 11 added to ignored list
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 5
 new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
 index 17 added to ignored list
 QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
 iteration: 6
 new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
 index 7 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X2 Y4)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 3

new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18

θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18

θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 5
 new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
 index 17 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
 QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
 iteration: 3
 selected second largest gradient
 index 11 added to ignored list
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 5
 new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
 index 17 added to ignored list
 QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
 iteration: 6
 new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
 index 7 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X2 Y4)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
 QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
 iteration: 3
 selected second largest gradient
 index 11 added to ignored list
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
 QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
 iteration: 3
 selected second largest gradient
 index 11 added to ignored list
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 5
 new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
 index 17 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]

index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]

index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.1195282339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient

index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6

new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]

index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.1195282339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]

index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.1195282339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2

new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.1195282339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')

θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)

iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3

new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18

θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18

θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]

index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)

iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)

iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]

QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18

θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]

index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.6255775291708149]

QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list

QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
ignored list emptied: [] -> []
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
ignored list emptied: [] -> []
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list

QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')

θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)

iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')

θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list

QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient

index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18

θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18

θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18

θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18

θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3

selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)

iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)

iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)

iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)

iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)

iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)

iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)

iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)

iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)

iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)

iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18

FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5

new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
θ: [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]

index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.1195282339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)

iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUDED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUDED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUDED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18

θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)

iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]

index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list

QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient

index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list

new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
θ: [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]

QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list

QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 3
 new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
 index 11 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 5
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
 QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
 iteration: 3
 selected second largest gradient
 index 11 added to ignored list
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)

iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]

QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 3
 new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
 index 11 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 5
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 3
 new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
 index 11 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 5
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)

iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 Y4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 Y4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)

iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
ignored list emptied: [] -> []
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)

iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)

iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list

new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
θ: [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
θ: [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
θ: [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
θ: [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
θ: [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
θ: [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18

θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3

new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
 index 11 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
 QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
 iteration: 3
 selected second largest gradient
 index 11 added to ignored list
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 4
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
 index 1 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X0 Y4)
 iteration: 1
 new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
 QSCI energy: -0.6503062958715782, (new generator X0 Y4)
 iteration: 2
 new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
 QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
 iteration: 3
 selected second largest gradient
 index 11 added to ignored list
 new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
 index 5 added to ignored list
 QSCI energy: -0.695939025880892, (new generator X1 Y5)
 iteration: 4

new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 X2 X4 Y5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 X2 X4 Y5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 Y1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y1 X4 X5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]

QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18

θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'Y0 X1 X4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.6255775291708149]
QSCI energy: -0.695939025880892, (new generator Y0 X1 X4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.11952823339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
FUSED: ('X1 Y5', 'X1 Y5')
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 6
new generator: ['1.0', 'Y1 X2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]

index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator Y1 X2 X4 X5)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X0 X1 Y4 X5'], index: 11 out of 18. # precise gradient: 18
 θ : [-0.6255774986171946]
QSCI energy: -0.695939025880892, (new generator X0 X1 Y4 X5)
iteration: 3
selected second largest gradient
index 11 added to ignored list
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [0.]
index 5 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 4
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
FUSED: ('X0 Y4', 'X0 Y4')
 θ : [0.]
index 1 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 Y4)
iteration: 5
new generator: ['1.0', 'X1 Y2 X4 X5'], index: 17 out of 18. # precise gradient: 18
 θ : [0.]
index 17 added to ignored list
QSCI energy: -0.695939025880892, (new generator X1 Y2 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y4'], index: 7 out of 18. # precise gradient: 18
 θ : [0.]
index 7 added to ignored list
QSCI energy: -0.695939025880892, (new generator X2 Y4)
iteration: 1
new generator: ['1.0', 'X0 Y4'], index: 1 out of 18. # precise gradient: 18
 θ : [-1.0347140196425504]
QSCI energy: -0.6503062958715782, (new generator X0 Y4)
iteration: 2
new generator: ['1.0', 'X1 Y5'], index: 5 out of 18. # precise gradient: 18
 θ : [-0.1195282339727324]
QSCI energy: -0.695939025880892, (new generator X1 Y5)
iteration: 3
new generator: ['1.0', 'X0 X1 X4 Y5'], index: 11 out of 18. # precise gradient: 18
 θ : [0.]
index 11 added to ignored list
QSCI energy: -0.695939025880892, (new generator X0 X1 X4 Y5)
iteration: 4

[illegible]

```

No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
test mps sampling took: (23.65818476676941, Counter({0: 6, 2: 4}))
/usr/local/lib/python3.10/site-packages/stopit/__init__.py:10: UserWarning:
pkg_resources is deprecated as an API. See https://setuptools.pypa.io/en/
latest/pkg_resources.html. The pkg_resources package is slated for removal as
early as 2025-11-30. Refrain from using this package or pin to Setuptools<81.
import pkg_resources
>> Start Stage 1
>> Read ham ../hamiltonian/, 08qubits_05.data
08qubits_05
>> Start processing: 08qubits_05.data with qubits 8
>> Running Miner
>>>> adding ham of size 30
test mps sampling took: (0.0013201236724853516, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.03
1 Execution time: 0:00:00.140948 ovlp:
(0.9999927999928+0.0026478026478027328j)
2 Execution time: 0:00:00.143117 ovlp:
(0.9999207999208+0.01092421092421092j)
3 Execution time: 0:00:00.145946 ovlp:
(0.9998703998703999+0.015982215982216053j)
4 Execution time: 0:00:00.149389 ovlp:
(0.9996867996867997+0.020219420219420137j)
5 Execution time: 0:00:00.153490 ovlp:
(0.9994815994815995+0.025155025155025212j)
6 Execution time: 0:00:00.158958 ovlp:
(0.9992943992943992+0.03088263088263088j)
7 Execution time: 0:00:00.165172 ovlp:
(0.999009999009999+0.03502623502623492j)
8 Execution time: 0:00:00.171514 ovlp:
(0.9986607986607987+0.03935703935703927j)
9 Execution time: 0:00:00.178471 ovlp:
(0.9984519984519984+0.046629046629046655j)
x_points = [np.float64(0.0), np.float64(0.03), np.float64(0.06),
np.float64(0.09), np.float64(0.12), np.float64(0.15), np.float64(0.18),
np.float64(0.21), np.float64(0.24), np.float64(0.27)] y_points = [1.          +0.j
0.9999927999928 +0.00264780264780273j
0.9999207999208 +0.01092421092421092j
0.9998703998703999+0.01598221598221605j
0.9996867996867997+0.02021942021942014j
0.9994815994815995+0.02515502515502521j

```

```

0.9992943992943992+0.03088263088263088j
0.999009999009999 +0.03502623502623492j
0.9986607986607987+0.03935703935703927j
0.9984519984519984+0.04662904662904666j]
fit1: [ 0.3427952879761482 -0.5149671881121548]
[ 0.3427952879761482 -0.5149671881121548 0.3428052878761482
-0.          ] 9.791404691970318e-11
[ 2.9249351760905079e-01 -4.3993215689355319e-01
2.9227378940877030e-01
-1.5909644908735687e-01 1.4786441558223857e-06]
5.516412257147131e-11
E_gs: -0.4399321568935532
test mps sampling took: (0.0013675689697265625, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.03
1 Execution time: 0:00:02.292121 ovlp:
(0.9999891999891999+0.00262260262260261j)
2 Execution time: 0:00:02.294146 ovlp:
(0.9999351999352+0.010632610632610673j)
3 Execution time: 0:00:02.296816 ovlp:
(0.9997623997623997+0.015647415647415563j)
4 Execution time: 0:00:02.300788 ovlp:
(0.9996147996147997+0.019830619830619733j)
5 Execution time: 0:00:02.304988 ovlp:
(0.9995103995103995+0.027001827001827072j)
6 Execution time: 0:00:02.310395 ovlp:
(0.9993483993483994+0.03141543141543135j)
7 Execution time: 0:00:02.316258 ovlp:
(0.998959598959599+0.03428463428463435j)
8 Execution time: 0:00:02.322359 ovlp:
(0.9987003987003986+0.042172242172242136j)
9 Execution time: 0:00:02.329761 ovlp:
(0.9982467982467982+0.04309744309744312j)
x_points = [np.float64(0.0), np.float64(0.03), np.float64(0.06),
np.float64(0.09), np.float64(0.12), np.float64(0.15), np.float64(0.18),
np.float64(0.21), np.float64(0.24), np.float64(0.27)] y_points = [1.          +0.j
0.9999891999891999+0.00262260262260261j
0.9999351999352 +0.01063261063261067j
0.9997623997623997+0.01564741564741556j
0.9996147996147997+0.01983061983061973j
0.9995103995103995+0.02700182700182707j
0.9993483993483994+0.03141543141543135j
0.998959598959599 +0.03428463428463435j
0.9987003987003986+0.04217224217224214j
0.9982467982467982+0.04309744309744312j]

```

fit1: [0.3385155673610397 -0.5084585785897018]
[0.3385155673610397 -0.5084585785897018 0.3385255672610397
-0.] 1.1167190180576185e-10
[2.8816624120072709e-01 -4.3320021408980464e-01
2.8804187735276426e-01
-1.5580520013007954e-01 1.4933215568921428e-06]
5.279981318045946e-11
E_gs: -0.43320021408980464
test mps sampling took: (0.0013875961303710938, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.17535780457128558
1 Execution time: 0:00:02.701665 ovlp:
(0.9993531993531994+0.028732228732228693j)
2 Execution time: 0:00:02.704512 ovlp:
(0.9972363972363973+0.05516705516705511j)
3 Execution time: 0:00:02.707693 ovlp:
(0.9937839937839938+0.08976668976668978j)
4 Execution time: 0:00:02.711018 ovlp:
(0.9894663894663895+0.11767151767151773j)
5 Execution time: 0:00:02.716075 ovlp:
(0.9832755832755833+0.14766794766794766j)
6 Execution time: 0:00:02.721567 ovlp:
(0.9754383754383755+0.1712299712299712j)
7 Execution time: 0:00:02.728462 ovlp:
(0.9668619668619669+0.19980679980679983j)
8 Execution time: 0:00:02.736054 ovlp:
(0.9575883575883577+0.22782922782922777j)
9 Execution time: 0:00:02.743508 ovlp:
(0.9456267456267455+0.2560868560868561j)
10 Execution time: 0:00:02.752399 ovlp:
(0.9320103320103321+0.28442848442848434j)
11 Execution time: 0:00:02.761671 ovlp:
(0.9195951195951195+0.3104181104181105j)
12 Execution time: 0:00:02.772317 ovlp:
(0.905071505071505+0.3337617337617338j)
13 Execution time: 0:00:02.783640 ovlp:
(0.8892038892038892+0.3572733572733573j)
14 Execution time: 0:00:02.794614 ovlp:
(0.8733698733698734+0.37688737688737683j)
15 Execution time: 0:00:02.807497 ovlp:
(0.8558306558306559+0.407043407043407j)
16 Execution time: 0:00:02.818888 ovlp:
(0.8359898359898359+0.4228522228522229j)
17 Execution time: 0:00:02.830797 ovlp:
(0.8145446145446145+0.44686784686784686j)

```

18 Execution time: 0:00:02.843458  ovlp:
(0.7937713937713937+0.46475986475986475j)
19 Execution time: 0:00:02.856670  ovlp:
(0.7753249753249754+0.48255948255948256j)
20 Execution time: 0:00:02.871559  ovlp:
(0.7538461538461538+0.5014007014007014j)
21 Execution time: 0:00:02.886326  ovlp:
(0.7321573321573323+0.5187047187047187j)
x_points = [np.float64(0.0), np.float64(0.17535780457128558),
np.float64(0.35071560914257116), np.float64(0.5260734137138567),
np.float64(0.7014312182851423), np.float64(0.8767890228564279),
np.float64(1.0521468274277135), np.float64(1.227504631998999),
np.float64(1.4028624365702846), np.float64(1.5782202411415702),
np.float64(1.7535780457128558), np.float64(1.9289358502841414),
np.float64(2.104293654855427), np.float64(2.2796514594267125),
np.float64(2.455009263997998), np.float64(2.6303670685692837),
np.float64(2.8057248731405693), np.float64(2.981082677711855),
np.float64(3.1564404822831404), np.float64(3.331798286854426),
np.float64(3.5071560914257116), np.float64(3.682513895996997)] y_points =
[1.          +0.j
0.9993531993531994+0.02873222873222869j
0.9972363972363973+0.05516705516705511j
0.9937839937839938+0.08976668976668978j
0.9894663894663895+0.11767151767151773j
0.9832755832755833+0.14766794766794766j
0.9754383754383755+0.1712299712299712j
0.9668619668619669+0.19980679980679983j
0.9575883575883577+0.22782922782922777j
0.9456267456267455+0.2560868560868561j
0.9320103320103321+0.28442848442848434j
0.9195951195951195+0.3104181104181105j
0.905071505071505 +0.3337617337617338j
0.8892038892038892+0.3572733572733573j
0.8733698733698734+0.37688737688737683j
0.8558306558306559+0.407043407043407j
0.8359898359898359+0.4228522228522229j
0.8145446145446145+0.44686784686784686j
0.7937713937713937+0.46475986475986475j
0.7753249753249754+0.48255948255948256j
0.7538461538461538+0.5014007014007014j
0.7321573321573323+0.5187047187047187j ]
fit1: [ 0.6352570994540687 -0.26113150961149334]
[ 0.6352570994540687 -0.26113150961149334 0.3647429005459313
-0.          ] 1.0975586467976865e-09
[ 5.149804596665490e-01 -2.875359759624673e-01
2.972052595237640e-01
-6.411855204699589e-02 8.633205415859046e-06]

```


4.939557049930135e-10

E_gs: -0.2875359759624673

test mps sampling took: (0.001383066177368164, Counter({0: 7, 2: 3}))

truncated ham size: 10 Number of fitting points: 22

shots per matrix element: 238095.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.07415553729067194

1 Execution time: 0:00:03.270912 ovlp:

(0.9998907998908+0.011621411621411726j)

2 Execution time: 0:00:03.272986 ovlp:

(0.9995799995799997+0.026590226590226695j)

3 Execution time: 0:00:03.275813 ovlp:

(0.9988659988659989+0.0375438375438375j)

4 Execution time: 0:00:03.279576 ovlp:

(0.9979083979083978+0.04990024990024988j)

5 Execution time: 0:00:03.283645 ovlp:

(0.9968751968751968+0.0648270648270648j)

6 Execution time: 0:00:03.288730 ovlp:

(0.9956571956571956+0.07799827799827797j)

7 Execution time: 0:00:03.294953 ovlp:

(0.993977193977194+0.09047229047229055j)

8 Execution time: 0:00:03.301832 ovlp:

(0.9922887922887922+0.10019950019950019j)

9 Execution time: 0:00:03.308775 ovlp:

(0.9901551901551902+0.11271551271551261j)

10 Execution time: 0:00:03.316364 ovlp:

(0.9875343875343876+0.12206472206472196j)

11 Execution time: 0:00:03.324458 ovlp:

(0.984972384972385+0.13610953610953613j)

12 Execution time: 0:00:03.333279 ovlp:

(0.982947982947983+0.14833154833154838j)

13 Execution time: 0:00:03.344035 ovlp:

(0.9793275793275793+0.15776475776475785j)

14 Execution time: 0:00:03.354924 ovlp:

(0.9759255759255758+0.17208677208677203j)

15 Execution time: 0:00:03.367835 ovlp:

(0.972985572985573+0.18115038115038118j)

16 Execution time: 0:00:03.389006 ovlp:

(0.9684411684411685+0.1964803964803965j)

17 Execution time: 0:00:03.408755 ovlp:

(0.9647031647031648+0.20824040824040835j)

18 Execution time: 0:00:03.426835 ovlp:

(0.9605367605367605+0.21943761943761952j)

19 Execution time: 0:00:03.441140 ovlp:

(0.9563955563955564+0.22862722862722862j)

20 Execution time: 0:00:03.459847 ovlp:

(0.9525483525483525+0.239009639009639j)

```

21 Execution time: 0:00:03.476830  ovlp:
(0.9467355467355467+0.25358365358365353j)
x_points = [np.float64(0.0), np.float64(0.07415553729067194),
np.float64(0.14831107458134388), np.float64(0.22246661187201583),
np.float64(0.29662214916268775), np.float64(0.3707776864533597),
np.float64(0.44493322374403166), np.float64(0.5190887610347036),
np.float64(0.5932442983253755), np.float64(0.6673998356160474),
np.float64(0.7415553729067194), np.float64(0.8157109101973913),
np.float64(0.8898664474880633), np.float64(0.9640219847787352),
np.float64(1.0381775220694072), np.float64(1.112333059360079),
np.float64(1.186488596650751), np.float64(1.260644133941423),
np.float64(1.3347996712320949), np.float64(1.4089552085227668),
np.float64(1.4831107458134387), np.float64(1.5572662831041106)] y_points
= [1.          +0.j
0.9998907998908  +0.01162141162141173j
0.9995799995799997+0.0265902265902267j
0.9988659988659989+0.0375438375438375j
0.9979083979083978+0.04990024990024988j
0.9968751968751968+0.0648270648270648j
0.9956571956571956+0.07799827799827797j
0.993977193977194  +0.09047229047229055j
0.9922887922887922+0.10019950019950019j
0.9901551901551902+0.11271551271551261j
0.9875343875343876+0.12206472206472196j
0.984972384972385  +0.13610953610953613j
0.982947982947983  +0.14833154833154838j
0.9793275793275793+0.15776475776475785j
0.9759255759255758+0.17208677208677203j
0.972985572985573  +0.18115038115038118j
0.9684411684411685+0.1964803964803965j
0.9647031647031648+0.20824040824040835j
0.9605367605367605+0.21943761943761952j
0.9563955563955564+0.22862722862722862j
0.9525483525483525+0.239009639009639j
0.9467355467355467+0.25358365358365353j]
fit1: [ 0.6294720812558698 -0.2658848873351388]
[ 0.6294720812558698 -0.2658848873351388  0.37052791874413016
 -0.          ] 3.1779229114122135e-10
[ 4.9037608155552209e-01 -2.9475644023608810e-01
 2.9213204753460204e-01
 -7.9497297979735287e-02  3.0983479494383737e-06]
2.900676012937299e-10
E_gs: -0.2947564402360881
test mps sampling took: (0.0013170242309570312, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80

```

N gate: 172 dt: 0.15770949166984527

- 1 Execution time: 0:00:03.986014 ovlp:
(0.9994719991551986+0.02634724215558748j)
- 2 Execution time: 0:00:03.988010 ovlp:
(0.9979839967743949+0.04971367954188732j)
- 3 Execution time: 0:00:03.990728 ovlp:
(0.9951231921971075+0.07796652474643961j)
- 4 Execution time: 0:00:03.994173 ovlp:
(0.9916383866214187+0.10660337056539282j)
- 5 Execution time: 0:00:03.998007 ovlp:
(0.9861951779122846+0.12913460661537068j)
- 6 Execution time: 0:00:04.002542 ovlp:
(0.9804159686655498+0.15677305083688142j)
- 7 Execution time: 0:00:04.007886 ovlp:
(0.9731103569765711+0.18578429725487555j)
- 8 Execution time: 0:00:04.013690 ovlp:
(0.9652095443352708+0.2072115315384504j)
- 9 Execution time: 0:00:04.021113 ovlp:
(0.9566463306341291+0.2335347736556379j)
- 10 Execution time: 0:00:04.029508 ovlp:
(0.9457599132158612+0.25301320482112777j)
- 11 Execution time: 0:00:04.037709 ovlp:
(0.9341438946302314+0.27924044678471494j)
- 12 Execution time: 0:00:04.046446 ovlp:
(0.92181747490796+0.30442128707405924j)
- 13 Execution time: 0:00:04.055825 ovlp:
(0.9104318566909706+0.3272597236155579j)
- 14 Execution time: 0:00:04.065741 ovlp:
(0.8958494333590934+0.34716055545688884j)
- 15 Execution time: 0:00:04.076427 ovlp:
(0.8810462096739355+0.36915419064670507j)
- 16 Execution time: 0:00:04.087713 ovlp:
(0.8646301834082935+0.3908694253910807j)
- 17 Execution time: 0:00:04.099516 ovlp:
(0.8494045590472945+0.4065558504893607j)
- 18 Execution time: 0:00:04.114108 ovlp:
(0.8323837318139709+0.42927908684653904j)
- 19 Execution time: 0:00:04.127593 ovlp:
(0.8165149064238504+0.4483255173208278j)
- 20 Execution time: 0:00:04.143657 ovlp:
(0.7977372763796422+0.4658359453375125j)
- 21 Execution time: 0:00:04.158380 ovlp:
(0.7759932415891866+0.48020716833146926j)
- 22 Execution time: 0:00:04.173293 ovlp:
(0.7575420120672194+0.49648879438207105j)
- 23 Execution time: 0:00:04.188954 ovlp:
(0.7391483826374121+0.5080376128601807j)

```
24 Execution time: 0:00:04.205124  ovlp:
(0.7170011472018356+0.5261432418291869j)
x_points = [np.float64(0.0), np.float64(0.15770949166984527),
np.float64(0.31541898333969054), np.float64(0.4731284750095358),
np.float64(0.6308379666793811), np.float64(0.7885474583492263),
np.float64(0.9462569500190716), np.float64(1.1039664416889168),
np.float64(1.2616759333587622), np.float64(1.4193854250286075),
np.float64(1.5770949166984527), np.float64(1.7348044083682979),
np.float64(1.8925139000381432), np.float64(2.0502233917079886),
np.float64(2.2079328833778336), np.float64(2.365642375047679),
np.float64(2.5233518667175243), np.float64(2.6810613583873697),
np.float64(2.838770850057215), np.float64(2.99648034172706),
np.float64(3.1541898333969054), np.float64(3.3118993250667508),
np.float64(3.4696088167365957), np.float64(3.627318308406441),
np.float64(3.7850278000762865)] y_points = [1.          +0.j
0.9994719991551986+0.02634724215558748j
0.9979839967743949+0.04971367954188732j
0.9951231921971075+0.07796652474643961j
0.9916383866214187+0.10660337056539282j
0.9861951779122846+0.12913460661537068j
0.9804159686655498+0.15677305083688142j
0.9731103569765711+0.18578429725487555j
0.9652095443352708+0.2072115315384504j
0.9566463306341291+0.2335347736556379j
0.9457599132158612+0.25301320482112777j
0.9341438946302314+0.27924044678471494j
0.92181747490796  +0.30442128707405924j
0.9104318566909706+0.3272597236155579j
0.8958494333590934+0.34716055545688884j
0.8810462096739355+0.36915419064670507j
0.8646301834082935+0.3908694253910807j
0.8494045590472945+0.4065558504893607j
0.8323837318139709+0.42927908684653904j
0.8165149064238504+0.4483255173208278j
0.7977372763796422+0.4658359453375125j
0.7759932415891866+0.48020716833146926j
0.7575420120672194+0.49648879438207105j
0.7391483826374121+0.5080376128601807j
0.7170011472018356+0.5261432418291869j ]
fit1: [ 0.6309627022610974 -0.2620786406975359]
[ 0.5789028853531017 -0.27365887549539497  0.3701383429117231
-0.02080958920255057] 1.2109758024060784e-09
[ 0.4104014171006749 -0.315561126100132  0.3890261562062959
-0.09107375996040991 -0.01468143400900256] 3.094024392105834e-10
E_gs: -0.315561126100132
test mps sampling took: (0.0013365745544433594, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 9
```

```

shots per matrix element: 625000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.06763842281691608
1 Execution time: 0:00:04.598790 ovlp:
(0.9998975999999999+0.01167040000000008j)
2 Execution time: 0:00:04.600815 ovlp:
(0.9995552000000001+0.023718399999999917j)
3 Execution time: 0:00:04.603939 ovlp:
(0.9991327999999999+0.032556800000000005j)
4 Execution time: 0:00:04.607561 ovlp:
(0.9983712+0.045206400000000009j)
5 Execution time: 0:00:04.611582 ovlp:
(0.9975296+0.057241600000000004j)
6 Execution time: 0:00:04.616472 ovlp:
(0.9963616+0.065241600000000001j)
7 Execution time: 0:00:04.621895 ovlp:
(0.9950496+0.082934400000000007j)
8 Execution time: 0:00:04.627896 ovlp:
(0.9933152000000001+0.09273599999999993j)
x_points = [np.float64(0.0), np.float64(0.06763842281691608),
np.float64(0.13527684563383216), np.float64(0.20291526845074825),
np.float64(0.2705536912676643), np.float64(0.3381921140845804),
np.float64(0.4058305369014965), np.float64(0.4734689597184126),
np.float64(0.5411073825353286)] y_points = [1.          +0.j
0.9998975999999999+0.01167040000000008j
0.9995552000000001+0.02371839999999992j
0.9991327999999999+0.032556800000000005j
0.9983712      +0.045206400000000009j
0.9975296      +0.0572416j
0.9963616      +0.065241600000000001j
0.9950496      +0.082934400000000007j
0.9933152000000001+0.09273599999999993j]
fit1: [ 0.5854336733413242 -0.2898792150916446]
[ 0.5854336733413242 -0.2898792150916446  0.41456632665867577
-0.          ] 1.1763144881236296e-10
[ 5.2945277886221909e-01 -2.5139266859033393e-01
3.8263044156616827e-01
-9.8752867035575870e-02  5.9110143566349452e-07]
1.6157293393207484e-10
E_gs: -0.25139266859033393
test mps sampling took: (0.001336812973022461, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.14710205139569285
1 Execution time: 0:00:05.254461 ovlp:
(0.9994816+0.024729599999999997j)

```

```

2 Execution time: 0:00:05.256464 ovlp:
(0.9979583999999999+0.049414400000000008j)
3 Execution time: 0:00:05.259323 ovlp:
(0.9956224+0.07367039999999991j)
4 Execution time: 0:00:05.263784 ovlp:
(0.9922944+0.09965439999999992j)
5 Execution time: 0:00:05.268462 ovlp:
(0.9874175999999999+0.12144639999999995j)
6 Execution time: 0:00:05.273142 ovlp:
(0.9822143999999999+0.14687359999999994j)
7 Execution time: 0:00:05.280464 ovlp:
(0.9762367999999999+0.1694848j)
8 Execution time: 0:00:05.287950 ovlp:
(0.9695296+0.195008000000000007j)
9 Execution time: 0:00:05.294782 ovlp:
(0.9603328+0.217785600000000002j)
10 Execution time: 0:00:05.301991 ovlp:
(0.9523648+0.242790400000000007j)
11 Execution time: 0:00:05.312316 ovlp:
(0.94158720000000001+0.261529600000000003j)
12 Execution time: 0:00:05.321681 ovlp:
(0.93175040000000001+0.2858752j)
13 Execution time: 0:00:05.332038 ovlp:
(0.9212928+0.30746239999999999j)
14 Execution time: 0:00:05.343219 ovlp:
(0.90898560000000001+0.32608640000000001j)
15 Execution time: 0:00:05.354211 ovlp:
(0.8952511999999999+0.34572160000000001j)
16 Execution time: 0:00:05.367353 ovlp: (0.8821824+0.3702656j)
x_points = [np.float64(0.0), np.float64(0.14710205139569285),
np.float64(0.2942041027913857), np.float64(0.4413061541870785),
np.float64(0.5884082055827714), np.float64(0.7355102569784643),
np.float64(0.882612308374157), np.float64(1.02971435976985),
np.float64(1.1768164111655428), np.float64(1.3239184625612357),
np.float64(1.4710205139569286), np.float64(1.6181225653526214),
np.float64(1.765224616748314), np.float64(1.912326668144007),
np.float64(2.0594287195397), np.float64(2.2065307709353927),
np.float64(2.3536328223310856)] y_points = [1.          +0.j
0.9994816      +0.024729599999999991j
0.9979583999999999+0.049414400000000008j
0.9956224      +0.07367039999999991j
0.9922944      +0.09965439999999992j
0.9874175999999999+0.12144639999999995j
0.9822143999999999+0.14687359999999994j
0.9762367999999999+0.1694848j
0.9695296      +0.195008000000000007j
0.9603328      +0.217785600000000002j

```

```

0.9523648      +0.242790400000000007j
0.94158720000000001+0.261529600000000003j
0.93175040000000001+0.2858752j
0.9212928      +0.30746239999999999j
0.90898560000000001+0.32608640000000001j
0.8952511999999999+0.34572160000000001j
0.8821824      +0.3702656j      ]
fit1: [ 0.630928073682997 -0.2652920963142739]
[ 0.630928073682997 -0.2652920963142739 0.36907192631700303
-0.      ] 8.952682926339173e-11
[ 5.1244136094333292e-01 -2.9073450145180579e-01
2.8148432134021056e-01
-6.7513026640454554e-02 2.6095577341846254e-06]
7.049336450034316e-11
E_gs: -0.2907345014518058
test mps sampling took: (0.0017962455749511719, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.059225322843057336
1 Execution time: 0:00:05.831892 ovlp:
(0.9999427999427999+0.008635008635008656j)
2 Execution time: 0:00:05.834934 ovlp:
(0.9997095997095997+0.020444620444620476j)
3 Execution time: 0:00:05.837827 ovlp:
(0.9992343992343993+0.029240229240229176j)
4 Execution time: 0:00:05.841552 ovlp:
(0.998939598939599+0.039536239536239526j)
5 Execution time: 0:00:05.848105 ovlp:
(0.998046398046398+0.05054945054945059j)
6 Execution time: 0:00:05.856429 ovlp:
(0.9971091971091972+0.059129459129459105j)
7 Execution time: 0:00:05.863114 ovlp:
(0.9962643962643962+0.07002827002826995j)
8 Execution time: 0:00:05.870737 ovlp:
(0.9949531949531949+0.08030228030228037j)
9 Execution time: 0:00:05.878849 ovlp:
(0.9936331936331937+0.09015829015829024j)
10 Execution time: 0:00:05.890344 ovlp:
(0.9923615923615923+0.09880429880429875j)
11 Execution time: 0:00:05.906297 ovlp:
(0.9904519904519904+0.11054791054791058j)
x_points = [np.float64(0.0), np.float64(0.059225322843057336),
np.float64(0.11845064568611467), np.float64(0.177675968529172),
np.float64(0.23690129137222934), np.float64(0.2961266142152867),
np.float64(0.355351937058344), np.float64(0.4145772599014014),
np.float64(0.4738025827444587), np.float64(0.533027905587516),

```

```

np.float64(0.5922532284305734), np.float64(0.6514785512736307)] y_points
= [1.          +0.j
0.9999427999427999+0.00863500863500866j
0.9997095997095997+0.02044462044462048j
0.9992343992343993+0.02924022924022918j
0.998939598939599 +0.03953623953623953j
0.998046398046398 +0.05054945054945059j
0.9971091971091972+0.05912945912945911j
0.9962643962643962+0.07002827002826995j
0.9949531949531949+0.08030228030228037j
0.9936331936331937+0.09015829015829024j
0.9923615923615923+0.09880429880429875j
0.9904519904519904+0.11054791054791058j]
fit1: [ 0.5843774306593408 -0.2928350649779308]
[ 0.5843774306593408 -0.2928350649779308 0.4156225693406592
-0.          ] 2.3702641450782023e-11
[ 5.2039359866932744e-01 -2.4932482339135187e-01
3.7837934901629539e-01
-1.0735187922638315e-01 6.9950682824745954e-07]
2.316873479865436e-11
E_gs: -0.24932482339135187
test mps sampling took: (0.0013227462768554688, Counter({2: 8, 0: 2}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.13899839634112865
1 Execution time: 0:00:06.602722 ovlp:
(0.9995871993395189+0.021384034214454672j)
2 Execution time: 0:00:06.604722 ovlp:
(0.9982623972198355+0.044894471831155025j)
3 Execution time: 0:00:06.608167 ovlp:
(0.9963519941631906+0.07038251261202011j)
4 Execution time: 0:00:06.612050 ovlp:
(0.993030388848622+0.09139694623511407j)
5 Execution time: 0:00:06.616232 ovlp:
(0.9893055828889326+0.11626098601757762j)
6 Execution time: 0:00:06.621717 ovlp:
(0.9844479751167601+0.13747701996323203j)
7 Execution time: 0:00:06.628142 ovlp:
(0.9789375663001061+0.1634066614506584j)
8 Execution time: 0:00:06.634795 ovlp:
(0.9720543552869685+0.1822898916638267j)
9 Execution time: 0:00:06.642811 ovlp:
(0.9655551448882318+0.20738433181493088j)
10 Execution time: 0:00:06.651508 ovlp:
(0.957788732461972+0.22786116457786343j)
11 Execution time: 0:00:06.660812 ovlp:

```


(0.9492831188529902+0.2442675908281453j)
12 Execution time: 0:00:06.670182 ovlp:
(0.9378879006206411+0.2712916340666145j)
13 Execution time: 0:00:06.681835 ovlp:
(0.9309086894539031+0.29148046636874625j)
14 Execution time: 0:00:06.694620 ovlp:
(0.9180734689175503+0.3098836958139133j)
15 Execution time: 0:00:06.706363 ovlp:
(0.9072254515607225+0.33391253426005485j)
16 Execution time: 0:00:06.719070 ovlp:
(0.8951198321917315+0.34769815631705003j)
17 Execution time: 0:00:06.733443 ovlp:
(0.8809406095049752+0.3692693908310254j)
18 Execution time: 0:00:06.747948 ovlp:
(0.8673757878012605+0.39125342600548163j)
19 Execution time: 0:00:06.762761 ovlp:
(0.8540701665122665+0.4013718421949475j)
20 Execution time: 0:00:06.777992 ovlp:
(0.8400253440405505+0.4229622767396428j)
21 Execution time: 0:00:06.795069 ovlp:
(0.8235901177441884+0.4404727047563277j)
22 Execution time: 0:00:06.811365 ovlp:
(0.808230093168149+0.45516072825716525j)
23 Execution time: 0:00:06.830037 ovlp:
(0.792572468115949+0.4702327523724037j)
24 Execution time: 0:00:06.848659 ovlp:
(0.7740444384711016+0.48107116971387165j)
x_points = [np.float64(0.0), np.float64(0.13899839634112865),
np.float64(0.2779967926822573), np.float64(0.41699518902338595),
np.float64(0.5559935853645146), np.float64(0.6949919817056432),
np.float64(0.8339903780467719), np.float64(0.9729887743879005),
np.float64(1.1119871707290292), np.float64(1.250985567070158),
np.float64(1.3899839634112865), np.float64(1.528982359752415),
np.float64(1.6679807560935438), np.float64(1.8069791524346726),
np.float64(1.945977548775801), np.float64(2.0849759451169296),
np.float64(2.2239743414580584), np.float64(2.362972737799187),
np.float64(2.501971134140316), np.float64(2.6409695304814442),
np.float64(2.779967926822573), np.float64(2.9189663231637017),
np.float64(3.05796471950483), np.float64(3.196963115845959),
np.float64(3.3359615121870876)] y_points = [1. +0.j
0.9995871993395189+0.02138403421445467j
0.9982623972198355+0.04489447183115503j
0.9963519941631906+0.07038251261202011j
0.993030388848622 +0.09139694623511407j
0.9893055828889326+0.11626098601757762j
0.9844479751167601+0.13747701996323203j
0.9789375663001061+0.1634066614506584j

0.9720543552869685+0.1822898916638267j
 0.9655551448882318+0.20738433181493088j
 0.957788732461972 +0.22786116457786343j
 0.9492831188529902+0.2442675908281453j
 0.9378879006206411+0.2712916340666145j
 0.9309086894539031+0.29148046636874625j
 0.9180734689175503+0.3098836958139133j
 0.9072254515607225+0.33391253426005485j
 0.8951198321917315+0.34769815631705003j
 0.8809406095049752+0.3692693908310254j
 0.8673757878012605+0.39125342600548163j
 0.8540701665122665+0.4013718421949475j
 0.8400253440405505+0.4229622767396428j
 0.8235901177441884+0.4404727047563277j
 0.808230093168149 +0.45516072825716525j
 0.792572468115949 +0.4702327523724037j
 0.7740444384711016+0.48107116971387165j]
 fit1: [0.6327302213427588 -0.2626635164970352]
 [0.6327302213427588 -0.2626635164970352 0.3672697786572412
 -0.] 1.2997344876234129e-09
 [5.0790689653406096e-01 -2.8874960979526598e-01
 2.6024122712924186e-01
 -7.8955424612043842e-02 1.6316465413485129e-06]
 7.054368020009961e-10
 E_gs: -0.288749609795266
 test mps sampling took: (0.0013546943664550781, Counter({0: 6, 2: 4}))
 truncated ham size: 10 Number of fitting points: 10
 shots per matrix element: 55555.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.2790541804985116
 1 Execution time: 0:00:07.287492 ovlp:
 (0.9982323982323982+0.04604944604944605j)
 2 Execution time: 0:00:07.289495 ovlp:
 (0.9931275931275931+0.09236709236709228j)
 3 Execution time: 0:00:07.293319 ovlp:
 (0.9845235845235845+0.1410895410895412j)
 4 Execution time: 0:00:07.296864 ovlp:
 (0.9732663732663733+0.18426078426078418j)
 5 Execution time: 0:00:07.301124 ovlp:
 (0.9569367569367568+0.23006003006002995j)
 6 Execution time: 0:00:07.306464 ovlp:
 (0.9392859392859392+0.2698328698328698j)
 7 Execution time: 0:00:07.311829 ovlp:
 (0.9178335178335177+0.31346131346131356j)
 8 Execution time: 0:00:07.319591 ovlp:
 (0.8930006930006931+0.35195255195255193j)
 9 Execution time: 0:00:07.327190 ovlp:

```

(0.8667530667530667+0.38895698895698905j)
x_points = [np.float64(0.0), np.float64(0.2790541804985116),
np.float64(0.5581083609970232), np.float64(0.8371625414955348),
np.float64(1.1162167219940464), np.float64(1.395270902492558),
np.float64(1.6743250829910696), np.float64(1.9533792634895812),
np.float64(2.232433443988093), np.float64(2.5114876244866045)] y_points
= [1.          +0.j
0.9982323982323982+0.04604944604944605j
0.9931275931275931+0.09236709236709228j
0.9845235845235845+0.1410895410895412j
0.9732663732663733+0.18426078426078418j
0.9569367569367568+0.23006003006002995j
0.9392859392859392+0.2698328698328698j
0.9178335178335177+0.31346131346131356j
0.8930006930006931+0.35195255195255193j
0.8667530667530667+0.38895698895698905j]
fit1: [ 0.6382706634018533 -0.26246443869092195]
[ 0.6382706634018533 -0.26246443869092195 0.36172933659814666
-0.          ] 2.538199161498972e-11
[ 5.0571509839380935e-01 -2.8891083634289327e-01
3.0523773646987595e-01
-7.1656560011239517e-02 1.3972718494756683e-06]
2.235371813205137e-11
E_gs: -0.2889108363428933
test mps sampling took: (0.0013031959533691406, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.22408017671117494
1 Execution time: 0:00:07.720315 ovlp:
(0.9988520000000001+0.038567999999999936j)
2 Execution time: 0:00:07.722364 ovlp:
(0.995536+0.07513199999999998j)
3 Execution time: 0:00:07.755788 ovlp:
(0.9899519999999999+0.10977999999999999j)
4 Execution time: 0:00:07.773693 ovlp:
(0.9822200000000001+0.1519520000000001j)
5 Execution time: 0:00:07.796958 ovlp: (0.972048+0.18539599999999999j)
6 Execution time: 0:00:07.804468 ovlp:
(0.9605360000000001+0.2197960000000001j)
7 Execution time: 0:00:07.814345 ovlp:
(0.946604+0.25581199999999993j)
8 Execution time: 0:00:07.826624 ovlp:
(0.9296960000000001+0.2879640000000001j)
9 Execution time: 0:00:07.833791 ovlp:
(0.9129240000000001+0.32173199999999999j)
10 Execution time: 0:00:07.842596 ovlp: (0.892412+0.3540160000000001j)

```

```

x_points = [np.float64(0.0), np.float64(0.22408017671117494),
np.float64(0.4481603534223499), np.float64(0.6722405301335248),
np.float64(0.8963207068446998), np.float64(1.1204008835558747),
np.float64(1.3444810602670496), np.float64(1.5685612369782247),
np.float64(1.7926414136893996), np.float64(2.0167215904005746),
np.float64(2.2408017671117495)] y_points = [1.          +0.j
0.9988520000000001+0.03856799999999994j
0.995536          +0.07513199999999998j
0.9899519999999999+0.10977999999999999j
0.9822200000000001+0.1519520000000001j
0.972048          +0.18539599999999999j
0.9605360000000001+0.2197960000000001j
0.946604          +0.25581199999999993j
0.9296960000000001+0.2879640000000001j
0.9129240000000001+0.3217319999999999j
0.892412          +0.3540160000000001j ]
fit1: [ 0.632276024599852 -0.26561243321968364]
[ 0.632276024599852 -0.26561243321968364 0.367723975400148
-0.          ] 6.671695756945334e-11
[ 4.9832149865950592e-01 -2.9081022533673956e-01
3.0671861391396182e-01
-7.5427961665738091e-02 1.6426345559538201e-06]
6.420537713914025e-11
E_gs: -0.29081022533673956
test mps sampling took: (0.001283884048461914, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.24807653867618953
1 Execution time: 0:00:08.296884 ovlp:
(0.998857598172157+0.044164870663793154j)
2 Execution time: 0:00:08.299415 ovlp:
(0.9944607911372658+0.0846001353602166j)
3 Execution time: 0:00:08.302265 ovlp:
(0.9880575808921295+0.12487219979551978j)
4 Execution time: 0:00:08.305749 ovlp:
(0.978515165624265+0.16431866290986075j)
5 Execution time: 0:00:08.309779 ovlp:
(0.9669663471461554+0.20399552639284213j)
6 Execution time: 0:00:08.314421 ovlp:
(0.950751921203074+0.24493959190334702j)
7 Execution time: 0:00:08.320078 ovlp:
(0.9366590986545578+0.28153485045576065j)
8 Execution time: 0:00:08.327776 ovlp:
(0.9158270653233045+0.3197813116500987j)
9 Execution time: 0:00:08.334633 ovlp:
(0.891750226800363+0.3518837630140208j)

```

10 Execution time: 0:00:08.343108 ovlp:
(0.869161390658225+0.3848022156835451j)

11 Execution time: 0:00:08.352124 ovlp:
(0.8440093504149606+0.4173078676925883j)

12 Execution time: 0:00:08.362119 ovlp:
(0.8181085089736144+0.4402327043723271j)

13 Execution time: 0:00:08.374920 ovlp:
(0.7891260626017003+0.47240235584376933j)

14 Execution time: 0:00:08.387499 ovlp:
(0.7565724105158569+0.49841839746943606j)

15 Execution time: 0:00:08.399897 ovlp:
(0.7218299549279279+0.5214200342720547j)

16 Execution time: 0:00:08.414311 ovlp:
(0.6926747082795333+0.539477663164261j)

17 Execution time: 0:00:08.426357 ovlp:
(0.6638266621226594+0.5560280896449434j)

18 Execution time: 0:00:08.441713 ovlp:
(0.628498605597769+0.5702649124238599j)

19 Execution time: 0:00:08.456760 ovlp:
(0.5931321490114385+0.5853753366005385j)

20 Execution time: 0:00:08.473123 ovlp:
(0.5603384965415945+0.5950425520680833j)

21 Execution time: 0:00:08.489948 ovlp:
(0.5256824410919057+0.600773761238018j)

22 Execution time: 0:00:08.509221 ovlp:
(0.48766638026620845+0.6064089702543525j)

23 Execution time: 0:00:08.529513 ovlp:
(0.46218793950070314+0.6099801759682815j)

24 Execution time: 0:00:08.549482 ovlp:
(0.42248227597164156+0.6067737708380334j)

x_points = [np.float64(0.0), np.float64(0.24807653867618953),
np.float64(0.49615307735237907), np.float64(0.7442296160285686),
np.float64(0.9923061547047581), np.float64(1.2403826933809476),
np.float64(1.4884592320571373), np.float64(1.7365357707333267),
np.float64(1.9846123094095163), np.float64(2.2326888480857057),
np.float64(2.4807653867618953), np.float64(2.728841925438085),
np.float64(2.9769184641142745), np.float64(3.224995002790464),
np.float64(3.4730715414666533), np.float64(3.721148080142843),
np.float64(3.9692246188190325), np.float64(4.217301157495222),
np.float64(4.465377696171411), np.float64(4.713454234847601),
np.float64(4.961530773523791), np.float64(5.209607312199981),
np.float64(5.45768385087617), np.float64(5.705760389552359),
np.float64(5.953836928228549)] y_points = [1. +0.j
0.998857598172157 +0.04416487066379315j
0.9944607911372658 +0.0846001353602166j
0.9880575808921295 +0.12487219979551978j
0.978515165624265 +0.16431866290986075j

0.9669663471461554 +0.20399552639284213j
0.950751921203074 +0.24493959190334702j
0.9366590986545578 +0.28153485045576065j
0.9158270653233045 +0.3197813116500987j
0.891750226800363 +0.3518837630140208j
0.869161390658225 +0.3848022156835451j
0.8440093504149606 +0.4173078676925883j
0.8181085089736144 +0.4402327043723271j
0.7891260626017003 +0.47240235584376933j
0.7565724105158569 +0.49841839746943606j
0.7218299549279279 +0.5214200342720547j
0.6926747082795333 +0.539477663164261j
0.6638266621226594 +0.5560280896449434j
0.628498605597769 +0.5702649124238599j
0.5931321490114385 +0.5853753366005385j
0.5603384965415945 +0.5950425520680833j
0.5256824410919057 +0.600773761238018j
0.48766638026620845+0.6064089702543525j
0.46218793950070314+0.6099801759682815j
0.42248227597164156+0.6067737708380334j]
fit1: [0.6210866499447227 -0.2575019114808633]
[0.39773539518269163 -0.31530042770734784 0.445090368708681
-0.09227855901193181] 1.5920135142135073e-08
[0.3652841153251098 -0.3327504064535591 0.3444307249178717
-0.09151875052702196 -0.05542366237116288] 2.1207312718171583e-09
E_gs: -0.3327504064535591
test mps sampling took: (0.0013179779052734375, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.25891257438811976
1 Execution time: 0:00:09.178603 ovlp:
(0.9986272+0.043625599999999993j)
2 Execution time: 0:00:09.180677 ovlp:
(0.9940800000000001+0.084444799999999999j)
3 Execution time: 0:00:09.183606 ovlp:
(0.9865664000000001+0.12950400000000006j)
4 Execution time: 0:00:09.187628 ovlp: (0.9768288+0.17213759999999999j)
5 Execution time: 0:00:09.191606 ovlp: (0.9630432+0.2122944j)
6 Execution time: 0:00:09.197276 ovlp:
(0.9475488000000001+0.25286720000000007j)
7 Execution time: 0:00:09.203133 ovlp:
(0.9290495999999999+0.29162240000000006j)
8 Execution time: 0:00:09.210157 ovlp: (0.908032+0.3285408000000001j)
x_points = [np.float64(0.0), np.float64(0.25891257438811976),
np.float64(0.5178251487762395), np.float64(0.7767377231643593),
np.float64(1.035650297552479), np.float64(1.2945628719405988),

```

np.float64(1.5534754463287186), np.float64(1.8123880207168384),
np.float64(2.071300595104958)] y_points = [1.          +0.j
0.9986272      +0.04362559999999993j
0.9940800000000001+0.08444479999999999j
0.9865664000000001+0.12950400000000006j
0.9768288      +0.17213759999999999j
0.9630432      +0.2122944j
0.9475488000000001+0.25286720000000007j
0.9290495999999999+0.29162240000000006j
0.908032       +0.32854080000000001j ]
fit1: [ 0.6183149560137005 -0.2701168104809227]
[ 0.6183149560137005 -0.2701168104809227  0.38168504398629954
 -0.          ] 3.2904569495396076e-11
[ 5.2075086625076206e-01 -2.8265060087500699e-01
 3.3839736074148363e-01
 -6.0947857411531588e-02  1.2277365884822394e-06]
7.907112521248568e-11
E_gs: -0.282650600875007
test mps sampling took: (0.001306772232055664, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.043858466670163666
1 Execution time: 0:00:09.736144 ovlp:
(0.9999552+0.0070144000000000087j)
2 Execution time: 0:00:09.738152 ovlp:
(0.9998592+0.014252799999999995j)
3 Execution time: 0:00:09.740857 ovlp:
(0.9996608+0.022278400000000003j)
4 Execution time: 0:00:09.744617 ovlp:
(0.99930880000000001+0.030028799999999997j)
x_points = [np.float64(0.0), np.float64(0.043858466670163666),
np.float64(0.08771693334032733), np.float64(0.131575400010491),
np.float64(0.17543386668065467)] y_points = [1.          +0.j
0.9999552      +0.007014400000000009j
0.9998592      +0.014252799999999995j
0.9996608      +0.022278400000000003j
0.99930880000000001+0.030028799999999997j]
fit1: [ 0.15483465437295912 -1.1627437420899216 ]
[ 0.15483465437295912 -1.1627437420899216  0.15484465427295913
 -0.          ] 4.4673280660394065e-11
[ 1.3454116173733516e-01 -1.0107742132222446e+00
 1.3450870436545057e-01
 -3.5750924697054981e-01  1.3156451376883692e-06]
4.52612914586806e-11
E_gs: -1.0107742132222446
test mps sampling took: (0.0013654232025146484, Counter({2: 6, 0: 4}))

```

truncated ham size: 10 Number of fitting points: 13

shots per matrix element: 416666.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.1326865903970637

1 Execution time: 0:00:10.005688 ovlp:

(0.9996207993932791+0.02240163584261734j)

2 Execution time: 0:00:10.007774 ovlp:

(0.9982575972121555+0.047625676201081824j)

3 Execution time: 0:00:10.010378 ovlp:

(0.996471994355191+0.06794410871057388j)

4 Execution time: 0:00:10.013700 ovlp:

(0.9937647900236641+0.0899617439387903j)

5 Execution time: 0:00:10.017745 ovlp:

(0.9903999846399754+0.11085137736220374j)

6 Execution time: 0:00:10.022217 ovlp:

(0.9856431770290832+0.13445301512482422j)

7 Execution time: 0:00:10.027433 ovlp:

(0.9809631695410712+0.15592344947751924j)

8 Execution time: 0:00:10.033224 ovlp:

(0.9752127603404166+0.17447547916076656j)

9 Execution time: 0:00:10.039698 ovlp:

(0.9688671501874404+0.1968819150110641j)

10 Execution time: 0:00:10.046755 ovlp:

(0.9616527386443818+0.21584194534711254j)

11 Execution time: 0:00:10.054602 ovlp:

(0.9521727234763575+0.23837798140477018j)

12 Execution time: 0:00:10.063202 ovlp:

(0.944411110577778+0.2561092097747357j)

x_points = [np.float64(0.0), np.float64(0.1326865903970637),
np.float64(0.2653731807941274), np.float64(0.3980597711911911),
np.float64(0.5307463615882548), np.float64(0.6634329519853186),
np.float64(0.7961195423823823), np.float64(0.9288061327794459),
np.float64(1.0614927231765097), np.float64(1.1941793135735734),
np.float64(1.3268659039706372), np.float64(1.4595524943677007),
np.float64(1.5922390847647645)] y_points = [1. +0.j

0.9996207993932791+0.02240163584261734j

0.9982575972121555+0.04762567620108182j

0.996471994355191 +0.06794410871057388j

0.9937647900236641+0.0899617439387903j

0.9903999846399754+0.11085137736220374j

0.9856431770290832+0.13445301512482422j

0.9809631695410712+0.15592344947751924j

0.9752127603404166+0.17447547916076656j

0.9688671501874404+0.1968819150110641j

0.9616527386443818+0.21584194534711254j

0.9521727234763575+0.23837798140477018j

0.944411110577778+0.2561092097747357j]

fit1: [0.6265353739424119 -0.2672641699800139]
[0.6265353739424119 -0.2672641699800139 0.3734646260575881
-0.] 1.0455036278717223e-10
[4.9681350523748169e-01 -2.9543758387471952e-01
2.7562379087840283e-01
-7.6420963266306777e-02 3.4405137114841698e-06]
9.277996668348549e-11
E_gs: -0.2954375838747195
test mps sampling took: (0.001363515853881836, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.07988228794651456
1 Execution time: 0:00:10.497773 ovlp:
(0.9998751998003197+0.01218721949955115j)
2 Execution time: 0:00:10.499787 ovlp:
(0.9994815991705586+0.02784484455175118j)
3 Execution time: 0:00:10.502409 ovlp:
(0.9985311976499163+0.0420336672538677j)
4 Execution time: 0:00:10.505840 ovlp:
(0.997715196344314+0.05456168729869959j)
5 Execution time: 0:00:10.509741 ovlp:
(0.9959487935180695+0.06980651169041874j)
6 Execution time: 0:00:10.514187 ovlp:
(0.9946719914751863+0.07857132571412118j)
7 Execution time: 0:00:10.520065 ovlp:
(0.9928959886335817+0.0922993476789562j)
8 Execution time: 0:00:10.527020 ovlp:
(0.9909471855154968+0.10452016723226754j)
9 Execution time: 0:00:10.534153 ovlp:
(0.9887295819673312+0.11965939145502635j)
10 Execution time: 0:00:10.541963 ovlp:
(0.9858687773900439+0.13150581040929676j)
11 Execution time: 0:00:10.551154 ovlp:
(0.9830463728741965+0.1460498336797338j)
12 Execution time: 0:00:10.559986 ovlp:
(0.9792255667609069+0.1584530535248856j)
13 Execution time: 0:00:10.569436 ovlp:
(0.9767679628287405+0.1712786740458785j)
14 Execution time: 0:00:10.579302 ovlp:
(0.97268795630073+0.18952830324528525j)
15 Execution time: 0:00:10.591362 ovlp:
(0.969155150648241+0.19829311726898768j)
16 Execution time: 0:00:10.603121 ovlp:
(0.9636063417701468+0.21290434064694508j)
17 Execution time: 0:00:10.616390 ovlp:
(0.9595455352728564+0.22262915620665003j)

18 Execution time: 0:00:10.629075 ovlp:
(0.9545247272395636+0.23488837582140132j)
19 Execution time: 0:00:10.642069 ovlp:
(0.9502431203889927+0.2473395957433533j)
20 Execution time: 0:00:10.655717 ovlp:
(0.9445023112036979+0.25950281520450424j)
21 Execution time: 0:00:10.669895 ovlp:
(0.9387903020644832+0.2713012340819745j)
22 Execution time: 0:00:10.684830 ovlp:
(0.9329822927716684+0.28373325397320626j)
23 Execution time: 0:00:10.702824 ovlp:
(0.9265406824650919+0.29769167630668214j)
24 Execution time: 0:00:10.719236 ovlp:
(0.9213374741399587+0.3098356957371131j)
x_points = [np.float64(0.0), np.float64(0.07988228794651456),
np.float64(0.15976457589302911), np.float64(0.23964686383954367),
np.float64(0.31952915178605823), np.float64(0.39941143973257276),
np.float64(0.47929372767908734), np.float64(0.5591760156256019),
np.float64(0.6390583035721165), np.float64(0.718940591518631),
np.float64(0.7988228794651455), np.float64(0.8787051674116602),
np.float64(0.9585874553581747), np.float64(1.0384697433046892),
np.float64(1.1183520312512039), np.float64(1.1982343191977183),
np.float64(1.278116607144233), np.float64(1.3579988950907476),
np.float64(1.437881183037262), np.float64(1.5177634709837766),
np.float64(1.597645758930291), np.float64(1.6775280468768057),
np.float64(1.7574103348233203), np.float64(1.8372926227698347),
np.float64(1.9171749107163494)] y_points = [1. +0.j
0.9998751998003197+0.01218721949955115j
0.9994815991705586+0.02784484455175118j
0.9985311976499163+0.0420336672538677j
0.997715196344314 +0.05456168729869959j
0.9959487935180695+0.06980651169041874j
0.9946719914751863+0.07857132571412118j
0.9928959886335817+0.0922993476789562j
0.9909471855154968+0.10452016723226754j
0.9887295819673312+0.11965939145502635j
0.9858687773900439+0.13150581040929676j
0.9830463728741965+0.1460498336797338j
0.9792255667609069+0.1584530535248856j
0.9767679628287405+0.1712786740458785j
0.97268795630073 +0.18952830324528525j
0.969155150648241 +0.19829311726898768j
0.9636063417701468+0.21290434064694508j
0.9595455352728564+0.22262915620665003j
0.9545247272395636+0.23488837582140132j
0.9502431203889927+0.2473395957433533j
0.9445023112036979+0.25950281520450424j

```

0.9387903020644832+0.2713012340819745j
0.9329822927716684+0.28373325397320626j
0.9265406824650919+0.29769167630668214j
0.9213374741399587+0.3098356957371131j ]
fit1: [ 0.630713173793979 -0.26713724009978973]
[ 0.630713173793979 -0.26713724009978973 0.36928682620602105
-0.          ] 2.6440888240707536e-10
[ 5.1417726474095515e-01 -2.8879934172111099e-01
2.8858752623817246e-01
-7.0108652711002056e-02 2.6942069485047700e-06]
2.170314570724257e-10
E_gs: -0.288799341721111
test mps sampling took: (0.0016398429870605469, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1877283846152924
1 Execution time: 0:00:11.176140 ovlp:
(0.99917439966976+0.03217561287024506j)
2 Execution time: 0:00:11.178105 ovlp:
(0.9969759987903994+0.06412682565073036j)
3 Execution time: 0:00:11.181593 ovlp:
(0.9930375972150389+0.09448203779281505j)
4 Execution time: 0:00:11.185099 ovlp:
(0.9874959949983979+0.12480604992241995j)
5 Execution time: 0:00:11.189596 ovlp:
(0.9804615921846369+0.1569252627701052j)
6 Execution time: 0:00:11.195140 ovlp:
(0.9725871890348756+0.18539407415762965j)
x_points = [np.float64(0.0), np.float64(0.1877283846152924),
np.float64(0.3754567692305848), np.float64(0.5631851538458772),
np.float64(0.7509135384611696), np.float64(0.938641923076462),
np.float64(1.1263703076917544)] y_points = [1.          +0.j
0.99917439966976 +0.03217561287024506j
0.9969759987903994+0.06412682565073036j
0.9930375972150389+0.09448203779281505j
0.9874959949983979+0.12480604992241995j
0.9804615921846369+0.1569252627701052j
0.9725871890348756+0.18539407415762965j]
fit1: [ 0.6046785923685155 -0.27767601827305094]
[ 0.6046785923685155 -0.27767601827305094 0.3953214076314845
-0.          ] 1.1915410972537474e-11
[ 5.4483701717871014e-01 -2.4843837121654869e-01
3.5945610961391083e-01
-9.1110373391621438e-02 7.8486233996227968e-07]
3.4237028652932683e-10
E_gs: -0.2484383712165487

```

test mps sampling took: (0.0013332366943359375, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.28224281605817964
1 Execution time: 0:00:11.833007 ovlp:
(0.9981871941990215+0.04997535992115165j)
2 Execution time: 0:00:11.835027 ovlp:
(0.9930655778098489+0.09042908937308591j)
3 Execution time: 0:00:11.837655 ovlp:
(0.9842479495934386+0.1398412474919919j)
4 Execution time: 0:00:11.841064 ovlp:
(0.9716991094371501+0.19087261079235462j)
5 Execution time: 0:00:11.844904 ovlp:
(0.956167059734591+0.23135274032876896j)
6 Execution time: 0:00:11.849373 ovlp:
(0.9362789960927875+0.27889929247773604j)
7 Execution time: 0:00:11.854596 ovlp:
(0.9156605301136964+0.31321940230208734j)
8 Execution time: 0:00:11.860492 ovlp:
(0.891117251575205+0.3540427329367455j)
9 Execution time: 0:00:11.867789 ovlp:
(0.8632739624766799+0.39270125664402133j)
10 Execution time: 0:00:11.876027 ovlp:
(0.8330722658312506+0.4265725650322081j)
11 Execution time: 0:00:11.884791 ovlp:
(0.8011897638072443+0.4566158611707558j)
12 Execution time: 0:00:11.895047 ovlp:
(0.7669752543208139+0.4865007568024218j)
13 Execution time: 0:00:11.904928 ovlp:
(0.7299535358513147+0.511422436551797j)
14 Execution time: 0:00:11.914973 ovlp:
(0.7005966419092542+0.5353673131754022j)
15 Execution time: 0:00:11.925539 ovlp:
(0.6586205075856242+0.5550089760287233j)
16 Execution time: 0:00:11.936661 ovlp:
(0.6206219859903552+0.5731194339821888j)
17 Execution time: 0:00:11.948348 ovlp:
(0.5810922594952304+0.5849026716885495j)
18 Execution time: 0:00:11.960596 ovlp:
(0.541395332465064+0.5961227075926643j)
19 Execution time: 0:00:11.973756 ovlp:
(0.5016192051814565+0.6030747298391355j)
20 Execution time: 0:00:11.987694 ovlp:
(0.4657502904009292+0.6076859445950227j)
21 Execution time: 0:00:12.004791 ovlp:
(0.4241085571473828+0.611434756591221j)

```

22 Execution time: 0:00:12.020364  ovlp:
(0.38664683726987925+0.6037875321201027j)
x_points = [np.float64(0.0), np.float64(0.28224281605817964),
np.float64(0.5644856321163593), np.float64(0.846728448174539),
np.float64(1.1289712642327185), np.float64(1.4112140802908981),
np.float64(1.693456896349078), np.float64(1.9756997124072575),
np.float64(2.257942528465437), np.float64(2.540185344523617),
np.float64(2.8224281605817962), np.float64(3.104670976639976),
np.float64(3.386913792698156), np.float64(3.669156608756335),
np.float64(3.951399424814515), np.float64(4.233642240872695),
np.float64(4.515885056930874), np.float64(4.7981278729890535),
np.float64(5.080370689047234), np.float64(5.362613505105413),
np.float64(5.6448563211635925), np.float64(5.927099137221773),
np.float64(6.209341953279952)] y_points = [1.          +0.j
0.9981871941990215 +0.04997535992115165j
0.9930655778098489 +0.09042908937308591j
0.9842479495934386 +0.1398412474919919j
0.9716991094371501 +0.19087261079235462j
0.956167059734591  +0.23135274032876896j
0.9362789960927875 +0.27889929247773604j
0.9156605301136964 +0.31321940230208734j
0.891117251575205  +0.3540427329367455j
0.8632739624766799 +0.39270125664402133j
0.8330722658312506 +0.4265725650322081j
0.8011897638072443 +0.4566158611707558j
0.7669752543208139 +0.4865007568024218j
0.7299535358513147 +0.511422436551797j
0.7005966419092542 +0.5353673131754022j
0.6586205075856242 +0.5550089760287233j
0.6206219859903552 +0.5731194339821888j
0.5810922594952304 +0.5849026716885495j
0.541395332465064  +0.5961227075926643j
0.5016192051814565 +0.6030747298391355j
0.4657502904009292 +0.6076859445950227j
0.4241085571473828 +0.611434756591221j
0.38664683726987925+0.6037875321201027j ]
fit1: [ 0.6168258912293736 -0.2580838622375678]
[ 0.32861918262536655 -0.3414487266943907  0.5249264679059561
-0.10750231814328395] 1.0867286819363578e-09
[ 0.38494788026972543 -0.32656843655520756  0.4297693019305441
-0.07799240745795603 -0.05128795373792591] 1.5884289182584537e-09
E_gs: -0.32656843655520756
test mps sampling took: (0.0013532638549804688, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.16299329460300044

```

```

1 Execution time: 0:00:12.506723 ovlp:
(0.9993183997273598+0.0286308114523246j)
2 Execution time: 0:00:12.508807 ovlp:
(0.9975207990083197+0.054565221826088806j)
3 Execution time: 0:00:12.511929 ovlp:
(0.994652797861119+0.08232123292849325j)
4 Execution time: 0:00:12.515466 ovlp:
(0.9907623963049585+0.10663084265233702j)
5 Execution time: 0:00:12.519480 ovlp:
(0.9846951938780775+0.13491245396498153j)
6 Execution time: 0:00:12.525232 ovlp:
(0.9791319916527967+0.16348206539282617j)
x_points = [np.float64(0.0), np.float64(0.16299329460300044),
np.float64(0.3259865892060009), np.float64(0.4889798838090013),
np.float64(0.6519731784120018), np.float64(0.8149664730150021),
np.float64(0.9779597676180026)] y_points = [1.          +0.j
0.9993183997273598+0.0286308114523246j
0.9975207990083197+0.05456522182608881j
0.994652797861119 +0.08232123292849325j
0.9907623963049585+0.10663084265233702j
0.9846951938780775+0.13491245396498153j
0.9791319916527967+0.16348206539282617j]
fit1: [ 0.6151881806763955 -0.27140272362557455]
[ 0.6151881806763955 -0.27140272362557455 0.38481181932360453
-0.          ] 1.861639369731947e-11
[ 5.4203164859371422e-01 -2.5913034069757929e-01
3.3209087064362874e-01
-8.3502617490279235e-02 1.6180338542062506e-06]
8.16284123512365e-11
E_gs: -0.2591303406975793
test mps sampling took: (0.001352548599243164, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1841929103829399
1 Execution time: 0:00:13.065608 ovlp:
(0.999216797493752+0.03673131754021619j)
2 Execution time: 0:00:13.067608 ovlp:
(0.9970607905945299+0.06354500334401081j)
3 Execution time: 0:00:13.071131 ovlp:
(0.9929159773311274+0.0901650885282832j)
4 Execution time: 0:00:13.074810 ovlp:
(0.9875567601816326+0.124317997817593j)
5 Execution time: 0:00:13.079473 ovlp:
(0.9812119398782075+0.15231088739483956j)
6 Execution time: 0:00:13.084538 ovlp:
(0.9723327114646767+0.18592699496638398j)

```

```

7 Execution time: 0:00:13.090448 ovlp:
(0.9641750853602731+0.20902706888662048j)
8 Execution time: 0:00:13.096986 ovlp:
(0.9521190467809497+0.23669435742194378j)
9 Execution time: 0:00:13.104417 ovlp:
(0.9406702101446724+0.27165686930198185j)
10 Execution time: 0:00:13.112312 ovlp:
(0.926070963427083+0.29720335105072326j)
11 Execution time: 0:00:13.121209 ovlp:
(0.9101693125418002+0.3258562427399767j)
12 Execution time: 0:00:13.129988 ovlp:
(0.8940124608398747+0.34979231933542176j)
13 Execution time: 0:00:13.140481 ovlp:
(0.8781548100953922+0.37537400119680386j)
14 Execution time: 0:00:13.152543 ovlp:
(0.858882748424795+0.3976116723573515j)
15 Execution time: 0:00:13.165592 ovlp:
(0.8395930866978774+0.4174557358583548j)
16 Execution time: 0:00:13.178028 ovlp:
(0.8209018268858461+0.4375990003168011j)
17 Execution time: 0:00:13.190937 ovlp:
(0.7992977577528249+0.4656270900066881j)
18 Execution time: 0:00:13.204901 ovlp:
(0.7786352916329333+0.48043753740011974j)
19 Execution time: 0:00:13.219166 ovlp:
(0.7552448167834136+0.49935759794431345j)
20 Execution time: 0:00:13.234770 ovlp:
(0.7314231405540497+0.5145992467175895j)
21 Execution time: 0:00:13.252112 ovlp:
(0.7075838642683656+0.5285296912950121j)
22 Execution time: 0:00:13.269000 ovlp:
(0.683885388433243+0.5422577352247526j)
x_points = [np.float64(0.0), np.float64(0.1841929103829399),
np.float64(0.3683858207658798), np.float64(0.5525787311488197),
np.float64(0.7367716415317596), np.float64(0.9209645519146994),
np.float64(1.1051574622976394), np.float64(1.2893503726805793),
np.float64(1.4735432830635191), np.float64(1.657736193446459),
np.float64(1.8419291038293988), np.float64(2.026122014212339),
np.float64(2.210314924595279), np.float64(2.3945078349782185),
np.float64(2.5787007453611586), np.float64(2.762893655744098),
np.float64(2.9470865661270382), np.float64(3.1312794765099783),
np.float64(3.315472386892918), np.float64(3.499665297275858),
np.float64(3.6838582076587976), np.float64(3.8680511180417376),
np.float64(4.052244028424678)] y_points = [1.          +0.j
0.999216797493752 +0.03673131754021619j
0.9970607905945299+0.06354500334401081j
0.9929159773311274+0.0901650885282832j

```

0.9875567601816326+0.124317997817593j
 0.9812119398782075+0.15231088739483956j
 0.9723327114646767+0.18592699496638398j
 0.9641750853602731+0.20902706888662048j
 0.9521190467809497+0.23669435742194378j
 0.9406702101446724+0.27165686930198185j
 0.926070963427083 +0.29720335105072326j
 0.9101693125418002+0.3258562427399767j
 0.8940124608398747+0.34979231933542176j
 0.8781548100953922+0.37537400119680386j
 0.858882748424795 +0.3976116723573515j
 0.8395930866978774+0.4174557358583548j
 0.8209018268858461+0.4375990003168011j
 0.7992977577528249+0.4656270900066881j
 0.7786352916329333+0.48043753740011974j
 0.7552448167834136+0.49935759794431345j
 0.7314231405540497+0.5145992467175895j
 0.7075838642683656+0.5285296912950121j
 0.683885388433243 +0.5422577352247526j]
 fit1: [0.6294099066182773 -0.2618518172941521]
 [0.4672728016053271 -0.30010481788935645 0.3965849378986634
 -0.06803766929127579] 2.3341291923376314e-09
 [0.45789452538267944 -0.30373057360527617 0.3112436674843436
 -0.07203380705842719 -0.02612609234669267] 1.8807125688116557e-09
 E_gs: -0.30373057360527617
 test mps sampling took: (0.0013167858123779297, Counter({0: 6, 2: 4}))
 truncated ham size: 10 Number of fitting points: 17
 shots per matrix element: 312500.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.1258216960837842
 1 Execution time: 0:00:13.875685 ovlp:
 (0.9996992+0.02238720000000005j)
 2 Execution time: 0:00:13.877689 ovlp:
 (0.9984063999999999+0.042867200000000105j)
 3 Execution time: 0:00:13.880251 ovlp:
 (0.9968064000000001+0.06350079999999991j)
 4 Execution time: 0:00:13.883625 ovlp:
 (0.9944831999999999+0.08141440000000011j)
 5 Execution time: 0:00:13.887462 ovlp: (0.9915263999999999+0.104352j)
 6 Execution time: 0:00:13.891927 ovlp:
 (0.9874752+0.12626559999999998j)
 7 Execution time: 0:00:13.897213 ovlp:
 (0.9823232+0.14686719999999998j)
 8 Execution time: 0:00:13.903011 ovlp:
 (0.9774655999999999+0.16776959999999996j)
 9 Execution time: 0:00:13.909528 ovlp:
 (0.9720960000000001+0.18735999999999997j)


```
10 Execution time: 0:00:13.916509  ovlp:
(0.9648832+0.20951040000000001j)
11 Execution time: 0:00:13.924157  ovlp:
(0.9576832+0.22764800000000007j)
12 Execution time: 0:00:13.932532  ovlp:
(0.95066239999999999+0.24759679999999995j)
13 Execution time: 0:00:13.942812  ovlp:
(0.9410816+0.26686079999999999j)
14 Execution time: 0:00:13.953641  ovlp:
(0.9323264+0.28582400000000001j)
15 Execution time: 0:00:13.964358  ovlp: (0.9228352+0.305056j)
16 Execution time: 0:00:13.975607  ovlp:
(0.91313280000000001+0.32022400000000006j)
x_points = [np.float64(0.0), np.float64(0.1258216960837842),
np.float64(0.2516433921675684), np.float64(0.3774650882513526),
np.float64(0.5032867843351368), np.float64(0.6291084804189211),
np.float64(0.7549301765027052), np.float64(0.8807518725864895),
np.float64(1.0065735686702737), np.float64(1.1323952647540578),
np.float64(1.2582169608378422), np.float64(1.3840386569216263),
np.float64(1.5098603530054104), np.float64(1.6356820490891948),
np.float64(1.761503745172979), np.float64(1.8873254412567633),
np.float64(2.0131471373405474)] y_points = [1.          +0.j
0.9996992      +0.022387200000000005j
0.9984063999999999+0.042867200000000011j
0.99680640000000001+0.063500799999999991j
0.99448319999999999+0.081414400000000011j
0.99152639999999999+0.104352j
0.9874752      +0.126265599999999998j
0.9823232      +0.146867199999999998j
0.97746559999999999+0.167769599999999996j
0.97209600000000001+0.187359999999999997j
0.9648832      +0.20951040000000001j
0.9576832      +0.22764800000000007j
0.95066239999999999+0.24759679999999995j
0.9410816      +0.26686079999999999j
0.9323264      +0.28582400000000001j
0.9228352      +0.305056j
0.91313280000000001+0.32022400000000006j]
fit1: [ 0.6375200267407793 -0.2631844086815265]
[ 0.6375200267407793 -0.2631844086815265  0.36247997325922066
-0.          ] 5.7369146575248375e-11
[ 5.3730368334784029e-01 -2.8256959103582702e-01
3.2269927950975591e-01
-5.1014109934036808e-02  1.2762468280592339e-06]
7.239634172153686e-11
E_gs: -0.282569591035827
test mps sampling took: (0.0013380050659179688, Counter({0: 6, 2: 4}))
```

truncated ham size: 10 Number of fitting points: 18

shots per matrix element: 294117.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.29739930932563824

1 Execution time: 0:00:14.392488 ovlp:

(0.9978443952576697+0.05211191464621212j)

2 Execution time: 0:00:14.394509 ovlp:

(0.9918467820629204+0.09888241754131855j)

3 Execution time: 0:00:14.397201 ovlp:

(0.9818167599968719+0.14769972493939476j)

4 Execution time: 0:00:14.400962 ovlp:

(0.9692163322759311+0.19748263446179593j)

5 Execution time: 0:00:14.405049 ovlp:

(0.9509582921082427+0.24406953695298128j)

6 Execution time: 0:00:14.410142 ovlp:

(0.9318366500406301+0.28854163479159656j)

7 Execution time: 0:00:14.416024 ovlp:

(0.9074517963939521+0.32878412332507123j)

8 Execution time: 0:00:14.422469 ovlp:

(0.8798097355814183+0.3717262177976792j)

9 Execution time: 0:00:14.429930 ovlp:

(0.8516984737366422+0.40827629820785605j)

10 Execution time: 0:00:14.438643 ovlp:

(0.8176575988467174+0.4454927800841162j)

11 Execution time: 0:00:14.446897 ovlp:

(0.7826443218175081+0.4777996511592326j)

12 Execution time: 0:00:14.456425 ovlp:

(0.7449858389688457+0.504952110894644j)

13 Execution time: 0:00:14.466446 ovlp:

(0.7080141576311467+0.5294525647956425j)

14 Execution time: 0:00:14.477771 ovlp:

(0.6676356687984712+0.5496894093167004j)

15 Execution time: 0:00:14.488536 ovlp:

(0.6281547819405202+0.5705994553188016j)

16 Execution time: 0:00:14.501835 ovlp:

(0.5880550937212061+0.5869670913276008j)

17 Execution time: 0:00:14.515371 ovlp:

(0.5445893980966758+0.592781104118429j)

x_points = [np.float64(0.0), np.float64(0.29739930932563824),

np.float64(0.5947986186512765), np.float64(0.8921979279769148),

np.float64(1.189597237302553), np.float64(1.4869965466281911),

np.float64(1.7843958559538295), np.float64(2.0817951652794675),

np.float64(2.379194474605106), np.float64(2.6765937839307443),

np.float64(2.9739930932563823), np.float64(3.2713924025820207),

np.float64(3.568791711907659), np.float64(3.866191021233297),

np.float64(4.163590330558935), np.float64(4.460989639884573),

np.float64(4.758388949210212), np.float64(5.05578825853585)] y_points =

```

[1.      +0.j
0.9978443952576697+0.05211191464621212j
0.9918467820629204+0.09888241754131855j
0.9818167599968719+0.14769972493939476j
0.9692163322759311+0.19748263446179593j
0.9509582921082427+0.24406953695298128j
0.9318366500406301+0.28854163479159656j
0.9074517963939521+0.32878412332507123j
0.8798097355814183+0.3717262177976792j
0.8516984737366422+0.40827629820785605j
0.8176575988467174+0.4454927800841162j
0.7826443218175081+0.4777996511592326j
0.7449858389688457+0.504952110894644j
0.7080141576311467+0.5294525647956425j
0.6676356687984712+0.5496894093167004j
0.6281547819405202+0.5705994553188016j
0.5880550937212061+0.5869670913276008j
0.5445893980966758+0.592781104118429j ]
fit1: [ 0.6234910843324288 -0.26020807119508876]
[ 0.35554464418902476 -0.3352038739659781  0.5584133818220959
-0.08873100128519561] 1.0786117060176014e-10
[ 0.3803911356887179 -0.32810335093891485  0.38975467687860976
-0.08388581583721104 -0.04830981940753123] 1.1530511003500685e-10
E_gs: -0.32810335093891485
test mps sampling took: (0.0012831687927246094, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.23544552209079805
1 Execution time: 0:00:14.940813 ovlp:
(0.998664+0.04062399999999999j)
2 Execution time: 0:00:14.943484 ovlp:
(0.9951920000000001+0.07786399999999993j)
3 Execution time: 0:00:14.947300 ovlp:
(0.9892319999999999+0.11596800000000007j)
4 Execution time: 0:00:14.951552 ovlp: (0.980216+0.15432j)
5 Execution time: 0:00:14.956461 ovlp:
(0.9690319999999999+0.1963600000000001j)
6 Execution time: 0:00:14.961478 ovlp:
(0.9559359999999999+0.22932799999999998j)
7 Execution time: 0:00:14.968087 ovlp: (0.9403760000000001+0.26576j)
8 Execution time: 0:00:14.974034 ovlp:
(0.9230799999999999+0.30557600000000007j)
9 Execution time: 0:00:14.982150 ovlp: (0.904032+0.335696j)
10 Execution time: 0:00:14.990054 ovlp: (0.88228+0.3697680000000001j)
11 Execution time: 0:00:14.998753 ovlp:
(0.8582320000000001+0.4002159999999999j)

```

```

12 Execution time: 0:00:15.009510  ovlp:
(0.8340799999999999+0.42414400000000001j)
13 Execution time: 0:00:15.020481  ovlp:
(0.8076159999999999+0.45179199999999997j)
14 Execution time: 0:00:15.031858  ovlp: (0.780168+0.47723200000000001j)
15 Execution time: 0:00:15.042789  ovlp: (0.751808+0.499104j)
16 Execution time: 0:00:15.057607  ovlp:
(0.7190399999999999+0.5194319999999999j)
17 Execution time: 0:00:15.074153  ovlp:
(0.68989600000000001+0.54180800000000001j)
18 Execution time: 0:00:15.088648  ovlp: (0.656768+0.555736j)
19 Execution time: 0:00:15.103766  ovlp: (0.625008+0.571512j)
20 Execution time: 0:00:15.117685  ovlp: (0.592984+0.58288800000000001j)
x_points = [np.float64(0.0), np.float64(0.23544552209079805),
np.float64(0.4708910441815961), np.float64(0.7063365662723942),
np.float64(0.9417820883631922), np.float64(1.1772276104539903),
np.float64(1.4126731325447883), np.float64(1.6481186546355864),
np.float64(1.8835641767263844), np.float64(2.1190096988171825),
np.float64(2.3544552209079805), np.float64(2.5899007429987786),
np.float64(2.8253462650895766), np.float64(3.0607917871803747),
np.float64(3.2962373092711728), np.float64(3.531682831361971),
np.float64(3.767128353452769), np.float64(4.0025738755435665),
np.float64(4.238019397634365), np.float64(4.4734649197251635),
np.float64(4.708910441815961)] y_points = [1.          +0.j
0.998664      +0.04062399999999999j
0.99519200000000001+0.07786399999999993j
0.9892319999999999+0.115968000000000007j
0.980216      +0.15432j
0.9690319999999999+0.19636000000000001j
0.9559359999999999+0.22932799999999998j
0.94037600000000001+0.26576j
0.9230799999999999+0.305576000000000007j
0.904032      +0.335696j
0.88228       +0.36976800000000001j
0.85823200000000001+0.40021599999999999j
0.8340799999999999+0.42414400000000001j
0.8076159999999999+0.45179199999999997j
0.780168      +0.47723200000000001j
0.751808      +0.499104j
0.7190399999999999+0.5194319999999999j
0.68989600000000001+0.54180800000000001j
0.656768      +0.555736j
0.625008      +0.571512j
0.592984      +0.58288800000000001j ]
fit1: [ 0.627045687670434 -0.26059557746613077]
[ 0.484994526849171 -0.29455615798679263 0.3866162956330788
-0.06081037646733816] 2.3227649752534964e-09

```

```

[ 0.39785002794240537 -0.32375463302054885 0.3824876098031686
 -0.0696269428609429 -0.05948711150500909] 2.2140561129336684e-10
E_gs: -0.32375463302054885
test mps sampling took: (0.0016515254974365234, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.13236159951813137
1 Execution time: 0:00:15.600343 ovlp:
(0.9995919998367999+0.022534809013923685j)
2 Execution time: 0:00:15.602303 ovlp:
(0.9984879993951998+0.043854017541607115j)
3 Execution time: 0:00:15.605738 ovlp:
(0.9963783985513595+0.06750362700145085j)
4 Execution time: 0:00:15.609196 ovlp:
(0.9937023974809589+0.08840043536017417j)
5 Execution time: 0:00:15.614664 ovlp:
(0.9902583961033584+0.11060284424113775j)
6 Execution time: 0:00:15.619860 ovlp:
(0.9858351943340777+0.13329485331794122j)
x_points = [np.float64(0.0), np.float64(0.13236159951813137),
np.float64(0.26472319903626274), np.float64(0.3970847985543941),
np.float64(0.5294463980725255), np.float64(0.6618079975906568),
np.float64(0.7941695971087882)] y_points = [1.          +0.j
0.9995919998367999+0.02253480901392368j
0.9984879993951998+0.04385401754160712j
0.9963783985513595+0.06750362700145085j
0.9937023974809589+0.08840043536017417j
0.9902583961033584+0.11060284424113775j
0.9858351943340777+0.13329485331794122j]
fit1: [ 0.5839524548118042 -0.2924138809847659]
[ 0.5839524548118042 -0.2924138809847659 0.41604754518819576
 -0.          ] 2.165190431054627e-11
[ 5.1789800105381711e-01 -2.4863325356359503e-01
 3.7670370510072693e-01
 -1.0774919529954256e-01 7.5839519483834932e-07]
4.281734350250287e-11
E_gs: -0.24863325356359503
test mps sampling took: (0.0013561248779296875, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2651768799814974
1 Execution time: 0:00:16.216375 ovlp:
(0.9984083977717568+0.04754106655749313j)
2 Execution time: 0:00:16.218358 ovlp:
(0.9935691909968674+0.08745072243101149j)

```

3 Execution time: 0:00:16.221406 ovlp:
(0.9863563808989333+0.13254918556885986j)
4 Execution time: 0:00:16.225031 ovlp:
(0.9746907645670704+0.1759088462723848j)
5 Execution time: 0:00:16.229088 ovlp:
(0.9613323458652843+0.22212051096871543j)
6 Execution time: 0:00:16.233791 ovlp:
(0.9450759231062924+0.2598497637896693j)
7 Execution time: 0:00:16.239129 ovlp:
(0.9241826938557713+0.29845301783422507j)
8 Execution time: 0:00:16.245026 ovlp:
(0.904053065674292+0.33210666494933094j)
9 Execution time: 0:00:16.252276 ovlp:
(0.8803170324438454+0.3727799218918906j)
10 Execution time: 0:00:16.260472 ovlp:
(0.8513093918331485+0.4058263681569154j)
11 Execution time: 0:00:16.268597 ovlp:
(0.824436154210616+0.4374560124384175j)
12 Execution time: 0:00:16.277961 ovlp:
(0.7935149109208752+0.4677148548007968j)
13 Execution time: 0:00:16.288259 ovlp:
(0.7608640652096912+0.4925180895253254j)
14 Execution time: 0:00:16.298156 ovlp:
(0.7300164220229908+0.5235129329181061j)
15 Execution time: 0:00:16.308928 ovlp:
(0.6917811684936359+0.5415357581500615j)
16 Execution time: 0:00:16.320319 ovlp:
(0.6574743204640487+0.5590893827251358j)
17 Execution time: 0:00:16.332396 ovlp:
(0.6190550666770933+0.5717394004351606j)
18 Execution time: 0:00:16.345125 ovlp:
(0.5814914140879797+0.5868826216356704j)
19 Execution time: 0:00:16.360789 ovlp:
(0.5446637625292676+0.5927614298660018j)
20 Execution time: 0:00:16.375273 ovlp:
(0.5110193154270415+0.6034334448068228j)
21 Execution time: 0:00:16.391665 ovlp:
(0.4707876591027227+0.610167854234996j)
22 Execution time: 0:00:16.407113 ovlp:
(0.43914881480834067+0.6057058479881872j)
23 Execution time: 0:00:16.422975 ovlp:
(0.402505163507229+0.6067546494565093j)
x_points = [np.float64(0.0), np.float64(0.2651768799814974),
np.float64(0.5303537599629948), np.float64(0.7955306399444922),
np.float64(1.0607075199259897), np.float64(1.325884399907487),
np.float64(1.5910612798889845), np.float64(1.856238159870482),
np.float64(2.1214150398519793), np.float64(2.3865919198334766),

```

np.float64(2.651768799814974), np.float64(2.9169456797964717),
np.float64(3.182122559777969), np.float64(3.4472994397594663),
np.float64(3.712476319740964), np.float64(3.9776531997224613),
np.float64(4.242830079703959), np.float64(4.508006959685456),
np.float64(4.773183839666953), np.float64(5.038360719648451),
np.float64(5.303537599629948), np.float64(5.568714479611446),
np.float64(5.833891359592943), np.float64(6.09906823957444)] y_points =
[1.          +0.j
 0.9984083977717568 +0.04754106655749313j
 0.9935691909968674 +0.08745072243101149j
 0.9863563808989333 +0.13254918556885986j
 0.9746907645670704 +0.1759088462723848j
 0.9613323458652843 +0.22212051096871543j
 0.9450759231062924 +0.2598497637896693j
 0.9241826938557713 +0.29845301783422507j
 0.904053065674292  +0.33210666494933094j
 0.8803170324438454 +0.3727799218918906j
 0.8513093918331485 +0.4058263681569154j
 0.824436154210616  +0.4374560124384175j
 0.7935149109208752 +0.4677148548007968j
 0.7608640652096912 +0.4925180895253254j
 0.7300164220229908 +0.5235129329181061j
 0.6917811684936359 +0.5415357581500615j
 0.6574743204640487 +0.5590893827251358j
 0.6190550666770933 +0.5717394004351606j
 0.5814914140879797 +0.5868826216356704j
 0.5446637625292676 +0.5927614298660018j
 0.5110193154270415 +0.6034334448068228j
 0.4707876591027227 +0.610167854234996j
 0.43914881480834067+0.6057058479881872j
 0.402505163507229  +0.6067546494565093j ]
fit1: [ 0.6189852545605605 -0.2578215213855634]
[ 0.4049486421684543 -0.31451746192140395  0.45229759908861356
 -0.08666127432827078] 8.222598811032902e-09
[ 0.37976069629084647 -0.3282079207462638  0.4164343617145701
 -0.08373723334100633 -0.04645445831544719] 1.2327033472249672e-09
E_gs: -0.3282079207462638
test mps sampling took: (0.0012919902801513672, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.08749316931218999
1 Execution time: 0:00:16.971081 ovlp:
(0.9998435997810398+0.01706142388599341j)
2 Execution time: 0:00:16.973256 ovlp:
(0.9993007990211187+0.028303839625375415j)
3 Execution time: 0:00:16.976075 ovlp:

```

(0.9984083977717568+0.04444986222980707j)
4 Execution time: 0:00:16.979503 ovlp:
(0.9972307961231146+0.0622978872170421j)
5 Execution time: 0:00:16.983633 ovlp:
(0.9958967942555119+0.0739083034716248j)
6 Execution time: 0:00:16.988846 ovlp:
(0.9936335910870275+0.09067992695189764j)
7 Execution time: 0:00:16.995046 ovlp:
(0.9915175881246234+0.10094714132599791j)
8 Execution time: 0:00:17.001351 ovlp:
(0.989318785046299+0.11544636162490618j)
9 Execution time: 0:00:17.009065 ovlp:
(0.986199980679973+0.12812397937357112j)
10 Execution time: 0:00:17.017716 ovlp:
(0.9825199755279657+0.1432672005740807j)
11 Execution time: 0:00:17.027779 ovlp:
(0.9797231716124402+0.16058162481427485j)
12 Execution time: 0:00:17.036799 ovlp:
(0.9767607674650745+0.17459324443054225j)
13 Execution time: 0:00:17.047058 ovlp:
(0.971397159956024+0.19098766738273443j)
14 Execution time: 0:00:17.058043 ovlp:
(0.9675607545850564+0.20317768444875828j)
15 Execution time: 0:00:17.070014 ovlp:
(0.9623259472563261+0.212294897212856j)
16 Execution time: 0:00:17.083773 ovlp:
(0.9571831400563962+0.2275209185292859j)
17 Execution time: 0:00:17.097316 ovlp:
(0.9521875330625462+0.24434774208683896j)
18 Execution time: 0:00:17.111427 ovlp:
(0.9468055255277357+0.25407215570101793j)
19 Execution time: 0:00:17.124881 ovlp:
(0.9394363152108414+0.270889779245691j)
20 Execution time: 0:00:17.140370 ovlp:
(0.9328859060402686+0.27901339061874686j)
21 Execution time: 0:00:17.157151 ovlp:
(0.9262894968052955+0.29198540877957235j)
22 Execution time: 0:00:17.175000 ovlp:
(0.9194354872096822+0.31278663790129313j)
23 Execution time: 0:00:17.191132 ovlp:
(0.9140994797392716+0.3226306516829123j)
x_points = [np.float64(0.0), np.float64(0.08749316931218999),
np.float64(0.17498633862437998), np.float64(0.26247950793657),
np.float64(0.34997267724875997), np.float64(0.43746584656094994),
np.float64(0.52495901587314), np.float64(0.61245218518533),
np.float64(0.6999453544975199), np.float64(0.7874385238097099),
np.float64(0.8749316931218999), np.float64(0.9624248624340899),


```

np.float64(1.04991803174628), np.float64(1.1374112010584698),
np.float64(1.22490437037066), np.float64(1.3123975396828498),
np.float64(1.3998907089950399), np.float64(1.48738387830723),
np.float64(1.5748770476194198), np.float64(1.66237021693161),
np.float64(1.7498633862437998), np.float64(1.8373565555559899),
np.float64(1.9248497248681797), np.float64(2.0123428941803696)] y_points
= [1.          +0.j
0.9998435997810398+0.01706142388599341j
0.9993007990211187+0.02830383962537542j
0.9984083977717568+0.04444986222980707j
0.9972307961231146+0.0622978872170421j
0.9958967942555119+0.0739083034716248j
0.9936335910870275+0.09067992695189764j
0.9915175881246234+0.10094714132599791j
0.989318785046299 +0.11544636162490618j
0.986199980679973 +0.12812397937357112j
0.9825199755279657+0.1432672005740807j
0.9797231716124402+0.16058162481427485j
0.9767607674650745+0.17459324443054225j
0.971397159956024 +0.19098766738273443j
0.9675607545850564+0.20317768444875828j
0.9623259472563261+0.212294897212856j
0.9571831400563962+0.2275209185292859j
0.9521875330625462+0.24434774208683896j
0.9468055255277357+0.25407215570101793j
0.9394363152108414+0.270889779245691j
0.9328859060402686+0.27901339061874686j
0.9262894968052955+0.29198540877957235j
0.9194354872096822+0.31278663790129313j
0.9140994797392716+0.3226306516829123j ]
fit1: [ 0.6324205365435822 -0.26482086018967516]
[ 0.6324205365435822 -0.26482086018967516 0.3675794634564178
-0.          ] 7.063847658572786e-10
[ 5.1499963071834309e-01 -2.8965739934156026e-01
2.8259307560667046e-01
-6.6160703340865240e-02 3.0530685664525923e-06]
7.180946787526412e-10
E_gs: -0.28965739934156026
test mps sampling took: (0.001344442367553711, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.055285136973104616
1 Execution time: 0:00:17.640187 ovlp:
(0.9999271999271999+0.010840210840210807j)
2 Execution time: 0:00:17.642960 ovlp:
(0.9997115997115997+0.019184219184219087j)

```

```

3 Execution time: 0:00:17.645851  ovlp:
(0.9994483994483994+0.02811622811622816j)
4 Execution time: 0:00:17.649684  ovlp:
(0.998949998949999+0.038381038381038346j)
5 Execution time: 0:00:17.654522  ovlp:
(0.9982751982751983+0.046400246400246425j)
6 Execution time: 0:00:17.659232  ovlp:
(0.9975807975807975+0.05395745395745388j)
7 Execution time: 0:00:17.665673  ovlp:
(0.9964467964467965+0.06533946533946544j)
x_points = [np.float64(0.0), np.float64(0.055285136973104616),
np.float64(0.11057027394620923), np.float64(0.16585541091931386),
np.float64(0.22114054789241847), np.float64(0.2764256848655231),
np.float64(0.3317108218386277), np.float64(0.3869959588117323)] y_points
= [1.          +0.j
0.9999271999271999+0.01084021084021081j
0.9997115997115997+0.01918421918421909j
0.9994483994483994+0.02811622811622816j
0.998949998949999 +0.03838103838103835j
0.9982751982751983+0.04640024640024643j
0.9975807975807975+0.05395745395745388j
0.9964467964467965+0.06533946533946544j]
fit1: [ 0.5854226896263229 -0.29277206811711776]
[ 0.5854226896263229 -0.29277206811711776  0.41457731037367707
-0.          ] 3.442461918788151e-11
[ 5.2715637455717124e-01 -2.5280157074557985e-01
3.8105283782166544e-01
-9.8478891314473807e-02  6.2365169314012990e-07]
2.8055968797988252e-11
E_gs: -0.25280157074557985
test mps sampling took: (0.001415252685546875, Counter({0: 5, 2: 5}))
truncated ham size: 10  Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 172 2 qubit gates: 80
N gate: 172  dt: 0.07629361309799118
1 Execution time: 0:00:18.305217  ovlp:
(0.9998251997552796+0.01632542285559202j)
2 Execution time: 0:00:18.307197  ovlp:
(0.9995675993946391+0.027908239071534613j)
3 Execution time: 0:00:18.310344  ovlp:
(0.9988131983384776+0.03647345106283151j)
4 Execution time: 0:00:18.314010  ovlp:
(0.9977275968186357+0.04831386763941459j)
5 Execution time: 0:00:18.318071  ovlp:
(0.9966971953760735+0.06254628756480263j)
6 Execution time: 0:00:18.322787  ovlp:
(0.9950687930963102+0.08024711234595738j)

```

```

7 Execution time: 0:00:18.328495 ovlp:
(0.9933667907135071+0.08974152563813598j)
8 Execution time: 0:00:18.335581 ovlp:
(0.9912783877897429+0.1048203467484854j)
9 Execution time: 0:00:18.342671 ovlp:
(0.9893463850849391+0.11415835982170375j)
10 Execution time: 0:00:18.350231 ovlp:
(0.987276382186935+0.12724077813708945j)
11 Execution time: 0:00:18.358295 ovlp:
(0.9837803772925282+0.14162039826855755j)
12 Execution time: 0:00:18.366975 ovlp:
(0.981627574278604+0.1525408135571389j)
13 Execution time: 0:00:18.376414 ovlp:
(0.9786007700410781+0.16324042853660004j)
14 Execution time: 0:00:18.386564 ovlp:
(0.9744147641806697+0.1779144490802287j)
15 Execution time: 0:00:18.397285 ovlp:
(0.9715351601492241+0.18951566532193143j)
16 Execution time: 0:00:18.409034 ovlp:
(0.9682323555252976+0.19959887943843113j)
17 Execution time: 0:00:18.421099 ovlp:
(0.9628595480033673+0.21493530090942126j)
18 Execution time: 0:00:18.433633 ovlp:
(0.9567599394639152+0.224954114935761j)
19 Execution time: 0:00:18.446928 ovlp:
(0.9544231361923907+0.23799973319962642j)
20 Execution time: 0:00:18.460786 ovlp:
(0.949482729275821+0.2532901546062165j)
21 Execution time: 0:00:18.475190 ovlp:
(0.9447907227070118+0.2632997686196761j)
22 Execution time: 0:00:18.490626 ovlp:
(0.9381483134076387+0.27178218049505265j)
23 Execution time: 0:00:18.508722 ovlp:
(0.9329963061948288+0.28055899278259j)
x_points = [np.float64(0.0), np.float64(0.07629361309799118),
np.float64(0.15258722619598236), np.float64(0.22888083929397354),
np.float64(0.3051744523919647), np.float64(0.38146806548995593),
np.float64(0.4577616785879471), np.float64(0.5340552916859382),
np.float64(0.6103489047839294), np.float64(0.6866425178819207),
np.float64(0.7629361309799119), np.float64(0.839229744077903),
np.float64(0.9155233571758942), np.float64(0.9918169702738854),
np.float64(1.0681105833718765), np.float64(1.1444041964698677),
np.float64(1.220697809567859), np.float64(1.29699142266585),
np.float64(1.3732850357638413), np.float64(1.4495786488618325),
np.float64(1.5258722619598237), np.float64(1.6021658750578147),
np.float64(1.678459488155806), np.float64(1.7547531012537971)] y_points =
[1.          +0.j

```

```

0.9998251997552796+0.01632542285559202j
0.9995675993946391+0.02790823907153461j
0.9988131983384776+0.03647345106283151j
0.9977275968186357+0.04831386763941459j
0.9966971953760735+0.06254628756480263j
0.9950687930963102+0.08024711234595738j
0.9933667907135071+0.08974152563813598j
0.9912783877897429+0.1048203467484854j
0.9893463850849391+0.11415835982170375j
0.987276382186935 +0.12724077813708945j
0.9837803772925282+0.14162039826855755j
0.981627574278604 +0.1525408135571389j
0.9786007700410781+0.16324042853660004j
0.9744147641806697+0.1779144490802287j
0.9715351601492241+0.18951566532193143j
0.9682323555252976+0.19959887943843113j
0.9628595480033673+0.21493530090942126j
0.9567599394639152+0.224954114935761j
0.9544231361923907+0.23799973319962642j
0.949482729275821 +0.2532901546062165j
0.9447907227070118+0.2632997686196761j
0.9381483134076387+0.27178218049505265j
0.9329963061948288+0.28055899278259j ]
fit1: [ 0.6354917927649926 -0.26457718894880994]
[ 0.6354917927649926 -0.26457718894880994 0.36450820723500743
-0.          ] 5.019205338305238e-10
[ 5.2824769641173641e-01 -2.8694998375021685e-01
3.1585795266252736e-01
-5.3430884025047816e-02 1.6770791246532452e-06]
4.735473395360734e-10
E_gs: -0.28694998375021685
test mps sampling took: (0.0013027191162109375, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.26644612470005086
1 Execution time: 0:00:19.001321 ovlp:
(0.9984736000000001+0.045356799999999975j)
2 Execution time: 0:00:19.003334 ovlp:
(0.9937392+0.089462399999999994j)
3 Execution time: 0:00:19.006987 ovlp:
(0.9858944000000001+0.13311999999999999j)
4 Execution time: 0:00:19.010206 ovlp:
(0.9748064000000001+0.17716320000000008j)
x_points = [np.float64(0.0), np.float64(0.26644612470005086),
np.float64(0.5328922494001017), np.float64(0.7993383741001525),
np.float64(1.0657844988002034)] y_points = [1.          +0.j

```

0.9984736000000001+0.04535679999999999j
0.9937392 +0.089462399999999994j
0.9858944000000001+0.13311999999999999j
0.9748064000000001+0.17716320000000008j]
fit1: [0.581905145961794 -0.28901988010811586]
[0.581905145961794 -0.28901988010811586 0.418094854038206
-0.] 1.627435198504566e-11
[5.1859215077186982e-01 -2.5336580694493477e-01
3.7766405336379627e-01
-9.9562059060410116e-02 8.2135767517595836e-07]
2.1751867677833976e-10
E_gs: -0.25336580694493477
test mps sampling took: (0.001260995864868164, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1714966614837842
1 Execution time: 0:00:19.690731 ovlp:
(0.9994035994035995+0.03103383103383095j)
2 Execution time: 0:00:19.692653 ovlp:
(0.9973791973791974+0.054973854973854985j)
3 Execution time: 0:00:19.695307 ovlp:
(0.9941787941787943+0.08745668745668755j)
4 Execution time: 0:00:19.699044 ovlp:
(0.9893151893151892+0.11504231504231499j)
5 Execution time: 0:00:19.703087 ovlp:
(0.9833679833679834+0.14584514584514574j)
6 Execution time: 0:00:19.707894 ovlp:
(0.9767907767907769+0.1721035721035722j)
7 Execution time: 0:00:19.713315 ovlp:
(0.9678615678615679+0.19883239883239878j)
8 Execution time: 0:00:19.720673 ovlp:
(0.9589827589827591+0.2254184254184255j)
9 Execution time: 0:00:19.727674 ovlp:
(0.9468195468195468+0.251122451122451j)
10 Execution time: 0:00:19.734914 ovlp:
(0.9362523362523363+0.2772548772548773j)
11 Execution time: 0:00:19.742787 ovlp:
(0.9235095235095234+0.30408450408450416j)
12 Execution time: 0:00:19.752206 ovlp:
(0.9074907074907075+0.3275289275289275j)
13 Execution time: 0:00:19.761999 ovlp:
(0.8935466935466936+0.35229215229215227j)
14 Execution time: 0:00:19.774574 ovlp:
(0.8758982758982758+0.374879774879775j)
15 Execution time: 0:00:19.787172 ovlp:
(0.8591066591066592+0.39589659589659587j)

```

16 Execution time: 0:00:19.798998  ovlp:
(0.8406014406014406+0.4193326193326192j)
17 Execution time: 0:00:19.813936  ovlp:
(0.8212898212898212+0.435989835989836j)
18 Execution time: 0:00:19.827687  ovlp:
(0.8046410046410046+0.4558138558138558j)
19 Execution time: 0:00:19.842549  ovlp:
(0.7861861861861861+0.47409227409227417j)
20 Execution time: 0:00:19.856607  ovlp:
(0.7631701631701631+0.4927486927486928j)
21 Execution time: 0:00:19.871482  ovlp:
(0.7397677397677398+0.5083055083055084j)
x_points = [np.float64(0.0), np.float64(0.1714966614837842),
np.float64(0.3429933229675684), np.float64(0.5144899844513526),
np.float64(0.6859866459351368), np.float64(0.857483307418921),
np.float64(1.0289799689027053), np.float64(1.2004766303864893),
np.float64(1.3719732918702736), np.float64(1.543469953354058),
np.float64(1.714966614837842), np.float64(1.8864632763216262),
np.float64(2.0579599378054105), np.float64(2.2294565992891946),
np.float64(2.4009532607729787), np.float64(2.572449922256763),
np.float64(2.7439465837405472), np.float64(2.9154432452243313),
np.float64(3.086939906708116), np.float64(3.2584365681919),
np.float64(3.429933229675684), np.float64(3.6014298911594684)] y_points
= [1.          +0.j
0.9994035994035995+0.03103383103383095j
0.9973791973791974+0.05497385497385499j
0.9941787941787943+0.08745668745668755j
0.9893151893151892+0.11504231504231499j
0.9833679833679834+0.14584514584514574j
0.9767907767907769+0.1721035721035722j
0.9678615678615679+0.19883239883239878j
0.9589827589827591+0.2254184254184255j
0.9468195468195468+0.251122451122451j
0.9362523362523363+0.2772548772548773j
0.9235095235095234+0.30408450408450416j
0.9074907074907075+0.3275289275289275j
0.8935466935466936+0.35229215229215227j
0.8758982758982758+0.374879774879775j
0.8591066591066592+0.39589659589659587j
0.8406014406014406+0.4193326193326192j
0.8212898212898212+0.435989835989836j
0.8046410046410046+0.4558138558138558j
0.7861861861861861+0.47409227409227417j
0.7631701631701631+0.4927486927486928j
0.7397677397677398+0.5083055083055084j ]
fit1: [ 0.6310283972076555 -0.26289304741829655]
[ 0.625146166569711 -0.264119146340329  0.36897962536797035

```

```

-0.00237172936397764] 1.38292164916283e-09
[ 0.4825735553072626 -0.2966457537036329 0.35225129943279393
-0.06856987150036069 -0.0012722737102205 ] 3.5975484562105754e-10
E_gs: -0.2966457537036329
test mps sampling took: (0.001293182373046875, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2404988228933547
1 Execution time: 0:00:20.213481 ovlp: (0.9987936+0.04001760000000001j)
2 Execution time: 0:00:20.215443 ovlp: (0.9949808+0.0795728j)
3 Execution time: 0:00:20.217974 ovlp:
(0.9885568+0.121296000000000007j)
4 Execution time: 0:00:20.221294 ovlp:
(0.9796351999999999+0.15965439999999997j)
x_points = [np.float64(0.0), np.float64(0.2404988228933547),
np.float64(0.4809976457867094), np.float64(0.7214964686800641),
np.float64(0.9619952915734188)] y_points = [1.          +0.j
0.9987936      +0.04001760000000001j
0.9949808      +0.0795728j
0.9885568      +0.121296000000000007j
0.9796351999999999+0.15965439999999997j]
fit1: [ 0.582517019840788 -0.2915164344737145]
[ 0.582517019840788 -0.2915164344737145 0.41748298015921204
-0.          ] 4.336750126224388e-11
[ 5.2256068855891669e-01 -2.5216720637031520e-01
3.8133790853517324e-01
-9.5605514344373560e-02 6.9635417595730882e-07]
9.041714894225893e-11
E_gs: -0.2521672063703152
test mps sampling took: (0.0013339519500732422, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.06329230672991734
1 Execution time: 0:00:20.790204 ovlp:
(0.9999135998617599+0.012345619752991643j)
2 Execution time: 0:00:20.792141 ovlp:
(0.9996303994086391+0.022228835566136862j)
3 Execution time: 0:00:20.794671 ovlp:
(0.9992751988403181+0.03277925244680402j)
4 Execution time: 0:00:20.797838 ovlp:
(0.9985551976883162+0.04090566544906471j)
5 Execution time: 0:00:20.801763 ovlp:
(0.9978111964979144+0.05285768457229523j)
6 Execution time: 0:00:20.806193 ovlp:
(0.9966015945625513+0.06418570269712442j)

```

```

7 Execution time: 0:00:20.811513  ovlp:
(0.9958671933875094+0.07682412291859664j)
8 Execution time: 0:00:20.818319  ovlp:
(0.9940095904153448+0.08276173241877194j)
9 Execution time: 0:00:20.826208  ovlp:
(0.9928191885107016+0.09614895383832622j)
10 Execution time: 0:00:20.833676  ovlp:
(0.9907599852159763+0.10551856882971022j)
11 Execution time: 0:00:20.841750  ovlp:
(0.9895551832882932+0.11661618658589856j)
12 Execution time: 0:00:20.850462  ovlp:
(0.9871695794713271+0.1276130041808068j)
x_points = [np.float64(0.0), np.float64(0.06329230672991734),
np.float64(0.12658461345983468), np.float64(0.18987692018975202),
np.float64(0.25316922691966937), np.float64(0.31646153364958673),
np.float64(0.37975384037950405), np.float64(0.44304614710942136),
np.float64(0.5063384538393387), np.float64(0.5696307605692561),
np.float64(0.6329230672991735), np.float64(0.6962153740290907),
np.float64(0.7595076807590081)] y_points = [1.          +0.j
0.9999135998617599+0.01234561975299164j
0.9996303994086391+0.02222883556613686j
0.9992751988403181+0.03277925244680402j
0.9985551976883162+0.04090566544906471j
0.9978111964979144+0.05285768457229523j
0.9966015945625513+0.06418570269712442j
0.9958671933875094+0.07682412291859664j
0.9940095904153448+0.08276173241877194j
0.9928191885107016+0.09614895383832622j
0.9907599852159763+0.10551856882971022j
0.9895551832882932+0.11661618658589856j
0.9871695794713271+0.1276130041808068j ]
fit1: [ 0.5813627559093109 -0.2923686919703112]
[ 0.5813627559093109 -0.2923686919703112  0.41863724409068914
-0.          ] 7.202468714196253e-11
[ 5.2218393959975129e-01 -2.5132838473201835e-01
3.8436669666980150e-01
-9.7779393917462126e-02  6.2872221221970141e-07]
8.413421902977372e-11
E_gs: -0.25132838473201835
test mps sampling took: (0.0012655258178710938, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.22758753704539905
1 Execution time: 0:00:21.447451  ovlp:
(0.9989664+0.0355711999999999914j)
2 Execution time: 0:00:21.449436  ovlp:

```



```

(0.9954048+0.077238399999999993j)
3 Execution time: 0:00:21.452220  ovlp:
(0.98941759999999999+0.114649599999999991j)
4 Execution time: 0:00:21.455416  ovlp: (0.9818528+0.15178240000000001j)
5 Execution time: 0:00:21.459200  ovlp:
(0.9714208+0.187161600000000004j)
6 Execution time: 0:00:21.463604  ovlp: (0.958928+0.22388800000000001j)
7 Execution time: 0:00:21.468787  ovlp:
(0.9445888+0.258419200000000007j)
8 Execution time: 0:00:21.474447  ovlp:
(0.92781120000000001+0.295401599999999993j)
x_points = [np.float64(0.0), np.float64(0.22758753704539905),
np.float64(0.4551750740907981), np.float64(0.6827626111361972),
np.float64(0.9103501481815962), np.float64(1.1379376852269953),
np.float64(1.3655252222723944), np.float64(1.5931127593177934),
np.float64(1.8207002963631924)] y_points = [1.          +0.j
0.9989664      +0.035571199999999991j
0.9954048      +0.077238399999999993j
0.98941759999999999+0.114649599999999991j
0.9818528      +0.15178240000000001j
0.9714208      +0.187161600000000004j
0.958928       +0.22388800000000001j
0.9445888      +0.258419200000000007j
0.92781120000000001+0.295401599999999993j]
fit1: [ 0.6219810650224834 -0.26971255841560265]
[ 0.6219810650224834 -0.26971255841560265  0.3780189349775166
-0.          ] 4.404664187271504e-11
[ 5.152398380277645e-01 -2.896918930186858e-01
2.739482019365798e-01
-6.876747762896722e-02  5.333406933316312e-06]
3.2660520676842995e-11
E_gs: -0.2896918930186858
test mps sampling took: (0.0012845993041992188, Counter({2: 5, 0: 5}))
truncated ham size: 10  Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 172 2 qubit gates: 80
N gate: 172  dt: 0.06003524288703909
1 Execution time: 0:00:21.900785  ovlp:
(0.9999119997183992+0.00958323066633815j)
2 Execution time: 0:00:21.902753  ovlp:
(0.9997887993241579+0.02212327079446652j)
3 Execution time: 0:00:21.905347  ovlp:
(0.9993311978598332+0.03116969974303907j)
4 Execution time: 0:00:21.908581  ovlp:
(0.9984775951283045+0.04723855116336373j)
5 Execution time: 0:00:21.912531  ovlp:
(0.9978879932415783+0.04994895983667158j)

```

```

6 Execution time: 0:00:21.917015  ovlp:
(0.9970959907071704+0.059734591150691685j)
7 Execution time: 0:00:21.923228  ovlp:
(0.9960223872716392+0.06937062198599042j)
8 Execution time: 0:00:21.929483  ovlp:
(0.9945087824281038+0.08128586011475236j)
9 Execution time: 0:00:21.936177  ovlp:
(0.9932503784012108+0.08989228765532054j)
10 Execution time: 0:00:21.944157  ovlp:
(0.9918335738674364+0.09856911542116942j)
11 Execution time: 0:00:21.953375  ovlp:
(0.9900735682354183+0.11047555352177119j)
12 Execution time: 0:00:21.963291  ovlp:
(0.9883399626878806+0.11758597627512413j)
13 Execution time: 0:00:21.973776  ovlp:
(0.9870991587173079+0.13101481924742164j)
14 Execution time: 0:00:21.984659  ovlp:
(0.9837199479038332+0.13776444084621065j)
15 Execution time: 0:00:21.995454  ovlp:
(0.9817047414551727+0.14663486923158153j)
16 Execution time: 0:00:22.009095  ovlp:
(0.9799095357105143+0.16003731211939876j)
17 Execution time: 0:00:22.022537  ovlp:
(0.9770055264176845+0.17332535464113485j)
18 Execution time: 0:00:22.035000  ovlp:
(0.9748319194621422+0.17636136435636596j)
19 Execution time: 0:00:22.050748  ovlp:
(0.9716111091555493+0.1914798127354007j)
20 Execution time: 0:00:22.065679  ovlp:
(0.9678886972438312+0.19827343447499035j)
21 Execution time: 0:00:22.081377  ovlp:
(0.9640694850223521+0.20832306663381317j)
22 Execution time: 0:00:22.099524  ovlp:
(0.9630750818402618+0.21799429758175237j)
x_points = [np.float64(0.0), np.float64(0.06003524288703909),
np.float64(0.12007048577407818), np.float64(0.18010572866111726),
np.float64(0.24014097154815636), np.float64(0.30017621443519543),
np.float64(0.36021145732223453), np.float64(0.4202467002092736),
np.float64(0.4802819430963127), np.float64(0.5403171859833518),
np.float64(0.6003524288703909), np.float64(0.66038767175743),
np.float64(0.7204229146444691), np.float64(0.7804581575315082),
np.float64(0.8404934004185473), np.float64(0.9005286433055864),
np.float64(0.9605638861926254), np.float64(1.0205991290796645),
np.float64(1.0806343719667035), np.float64(1.1406696148537427),
np.float64(1.2007048577407817), np.float64(1.260740100627821),
np.float64(1.32077534351486)] y_points = [1.          +0.j
0.9999119997183992+0.00958323066633815j

```

0.9997887993241579+0.02212327079446652j
 0.9993311978598332+0.03116969974303907j
 0.9984775951283045+0.04723855116336373j
 0.9978879932415783+0.04994895983667158j
 0.9970959907071704+0.05973459115069168j
 0.9960223872716392+0.06937062198599042j
 0.9945087824281038+0.08128586011475236j
 0.9932503784012108+0.08989228765532054j
 0.9918335738674364+0.09856911542116942j
 0.9900735682354183+0.11047555352177119j
 0.9883399626878806+0.11758597627512413j
 0.9870991587173079+0.13101481924742164j
 0.9837199479038332+0.13776444084621065j
 0.9817047414551727+0.14663486923158153j
 0.9799095357105143+0.16003731211939876j
 0.9770055264176845+0.17332535464113485j
 0.9748319194621422+0.17636136435636596j
 0.9716111091555493+0.1914798127354007j
 0.9678886972438312+0.19827343447499035j
 0.9640694850223521+0.20832306663381317j
 0.9630750818402618+0.21799429758175237j
 fit1: [0.6378935231898124 -0.26427161221258216]
 [0.6378935231898124 -0.26427161221258216 0.3621064768101876
 -0.] 1.4067562774582324e-09
 [5.4817544348759717e-01 -2.8189548322085139e-01
 1.9044210237317039e-01
 -7.4136902928233481e-02 8.7767251513802912e-07]
 1.3977412550587334e-09
 E_gs: -0.2818954832208514
 test mps sampling took: (0.0012865066528320312, Counter({2: 7, 0: 3}))
 truncated ham size: 10 Number of fitting points: 21
 shots per matrix element: 250000.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.2668051564217602
 1 Execution time: 0:00:22.593244 ovlp:
 (0.998264+0.04679999999999995j)
 2 Execution time: 0:00:22.595221 ovlp:
 (0.993384+0.08678399999999997j)
 3 Execution time: 0:00:22.597768 ovlp:
 (0.9861679999999999+0.13285600000000009j)
 4 Execution time: 0:00:22.601009 ovlp: (0.97512+0.17795999999999999j)
 5 Execution time: 0:00:22.604895 ovlp:
 (0.960064+0.22165600000000008j)
 6 Execution time: 0:00:22.609328 ovlp: (0.94391200000000001+0.260896j)
 7 Execution time: 0:00:22.614452 ovlp:
 (0.9244079999999999+0.29918399999999999j)
 8 Execution time: 0:00:22.620993 ovlp: (0.903848+0.338816j)

```

9 Execution time: 0:00:22.628244  ovlp: (0.876144+0.372328j)
10 Execution time: 0:00:22.636830  ovlp:
(0.851016+0.409351999999999994j)
11 Execution time: 0:00:22.644958  ovlp: (0.821512+0.44014400000000001j)
12 Execution time: 0:00:22.654400  ovlp:
(0.791376000000000001+0.46791999999999999j)
13 Execution time: 0:00:22.664609  ovlp: (0.75996+0.498224j)
14 Execution time: 0:00:22.675551  ovlp: (0.723544+0.5226j)
15 Execution time: 0:00:22.687116  ovlp: (0.6894+0.541072j)
16 Execution time: 0:00:22.700597  ovlp: (0.65087199999999999+0.559912j)
17 Execution time: 0:00:22.713170  ovlp:
(0.615104000000000001+0.57622400000000001j)
18 Execution time: 0:00:22.727754  ovlp:
(0.580592+0.58741599999999999j)
19 Execution time: 0:00:22.742322  ovlp: (0.545496+0.598144j)
20 Execution time: 0:00:22.756834  ovlp: (0.50233599999999999+0.60328j)
x_points = [np.float64(0.0), np.float64(0.2668051564217602),
np.float64(0.5336103128435205), np.float64(0.8004154692652807),
np.float64(1.067220625687041), np.float64(1.334025782108801),
np.float64(1.6008309385305615), np.float64(1.8676360949523216),
np.float64(2.134441251374082), np.float64(2.401246407795842),
np.float64(2.668051564217602), np.float64(2.9348567206393623),
np.float64(3.201661877061123), np.float64(3.468467033482883),
np.float64(3.7352721899046433), np.float64(4.002077346326403),
np.float64(4.268882502748164), np.float64(4.535687659169924),
np.float64(4.802492815591684), np.float64(5.069297972013445),
np.float64(5.336103128435204)] y_points = [1.          +0.j
0.998264      +0.046799999999999995j
0.993384      +0.086783999999999997j
0.98616799999999999+0.132856000000000009j
0.97512       +0.17795999999999999j
0.960064      +0.221656000000000008j
0.94391200000000001+0.260896j
0.92440799999999999+0.29918399999999999j
0.903848      +0.338816j
0.876144      +0.372328j
0.851016      +0.409351999999999994j
0.821512      +0.44014400000000001j
0.791376000000000001+0.46791999999999999j
0.75996       +0.498224j
0.723544      +0.5226j
0.6894        +0.541072j
0.65087199999999999+0.559912j
0.615104000000000001+0.57622400000000001j
0.580592      +0.58741599999999999j
0.545496      +0.598144j
0.50233599999999999+0.60328j      ]

```

```

fit1: [ 0.624576341924515 -0.25931800602488986]
[ 0.4507282402442807 -0.3020674953263061 0.41131694409894604
-0.07341238060607978] 3.2572211269267472e-09
[ 0.45607536166978935 -0.30253427852670045 0.3355337185245598
-0.06654586694661484 -0.0310263940382778 ] 2.088061777895792e-09
E_gs: -0.30253427852670045
test mps sampling took: (0.0014107227325439453, Counter({2: 9, 0: 1}))
truncated ham size: 10 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.017778477257961337
1 Execution time: 0:00:23.222273 ovlp:
(0.99999039998464+0.0023808038092860695j)
2 Execution time: 0:00:23.224397 ovlp:
(0.99999039998464+0.0028416045465673445j)
3 Execution time: 0:00:23.227110 ovlp:
(0.9999183998694399+0.008011212817940594j)
4 Execution time: 0:00:23.230334 ovlp:
(0.9999039998463997+0.011553618485789618j)
5 Execution time: 0:00:23.234218 ovlp:
(0.9997263995622394+0.01535522456835925j)
6 Execution time: 0:00:23.239140 ovlp:
(0.9997935996697596+0.01857122971396752j)
7 Execution time: 0:00:23.244754 ovlp:
(0.9996111993779191+0.018811230097968146j)
8 Execution time: 0:00:23.251243 ovlp:
(0.9995055992089588+0.023764838023740742j)
9 Execution time: 0:00:23.258188 ovlp:
(0.9994095990553584+0.0271440434304695j)
10 Execution time: 0:00:23.265636 ovlp:
(0.9993135989017583+0.0305760489216782j)
11 Execution time: 0:00:23.273429 ovlp:
(0.9991023985638376+0.031929651087441835j)
12 Execution time: 0:00:23.283636 ovlp:
(0.998833598133757+0.03755046008073615j)
x_points = [np.float64(0.0), np.float64(0.017778477257961337),
np.float64(0.035556954515922674), np.float64(0.053335431773884015),
np.float64(0.07111390903184535), np.float64(0.08889238628980668),
np.float64(0.10667086354776803), np.float64(0.12444934080572936),
np.float64(0.1422278180636907), np.float64(0.16000629532165203),
np.float64(0.17778477257961336), np.float64(0.1955632498375747),
np.float64(0.21334172709553606)] y_points = [1. +0.j
0.99999039998464 +0.00238080380928607j
0.99999039998464 +0.00284160454656734j
0.9999183998694399+0.00801121281794059j
0.9999039998463997+0.01155361848578962j
0.9997263995622394+0.01535522456835925j

```

0.9997935996697596+0.01857122971396752j
 0.9996111993779191+0.01881123009796815j
 0.9995055992089588+0.02376483802374074j
 0.9994095990553584+0.0271440434304695j
 0.9993135989017583+0.0305760489216782j
 0.9991023985638376+0.03192965108744183j
 0.998833598133757 +0.03755046008073615j]
 fit1: [0.22166027851515385 -0.7805480841474098]
 [0.22166027851515385 -0.7805480841474098 0.22167027841515385
 -0.] 1.219806342224011e-10
 [1.9329686675906729e-01 -6.8168660930469083e-01
 1.9311688862777807e-01
 -2.5371885659894111e-01 1.2951146340951985e-06]
 2.771146564192908e-10
 E_gs: -0.6816866093046908
 test mps sampling took: (0.0013041496276855469, Counter({0: 5, 2: 5}))
 truncated ham size: 10 Number of fitting points: 25
 shots per matrix element: 208333.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.20151673320850574
 1 Execution time: 0:00:23.665366 ovlp:
 (0.9989727983564773+0.031502450403920745j)
 2 Execution time: 0:00:23.667325 ovlp:
 (0.9967263947622316+0.06800170880273404j)
 3 Execution time: 0:00:23.669847 ovlp:
 (0.9917151867442988+0.09955695929113495j)
 4 Execution time: 0:00:23.673021 ovlp:
 (0.9853311765298824+0.1346066153705845j)
 5 Execution time: 0:00:23.677000 ovlp:
 (0.9771423634277814+0.16604666567466508j)
 6 Execution time: 0:00:23.681448 ovlp:
 (0.967177547484076+0.19943551909683066j)
 7 Execution time: 0:00:23.686537 ovlp:
 (0.9565695305112487+0.23318917310267695j)
 8 Execution time: 0:00:23.692297 ovlp:
 (0.9428415085464137+0.2661652258643614j)
 9 Execution time: 0:00:23.699145 ovlp:
 (0.9307742892388629+0.29449487119179385j)
 10 Execution time: 0:00:23.706381 ovlp:
 (0.9131486610378576+0.3201653122644996j)
 11 Execution time: 0:00:23.714313 ovlp:
 (0.895292632468212+0.3491477586364138j)
 12 Execution time: 0:00:23.722852 ovlp:
 (0.8771486034377656+0.3762870020592033j)
 13 Execution time: 0:00:23.733823 ovlp:
 (0.8557597692156307+0.40350304560487293j)
 14 Execution time: 0:00:23.745177 ovlp:

```

(0.8329597327355724+0.4276182841892546j)
15 Execution time: 0:00:23.755858 ovlp:
(0.8092284947655917+0.4506679210686737j)
16 Execution time: 0:00:23.767930 ovlp:
(0.7884540615264986+0.46880235008376014j)
17 Execution time: 0:00:23.780125 ovlp:
(0.761353218165149+0.4966807946892715j)
18 Execution time: 0:00:23.795179 ovlp:
(0.7395323832518133+0.5080184128294605j)
19 Execution time: 0:00:23.809499 ovlp:
(0.7139771423634278+0.5283512453619925j)
20 Execution time: 0:00:23.825301 ovlp:
(0.6840922945476713+0.5435576696922715j)
21 Execution time: 0:00:23.841468 ovlp:
(0.658239453183125+0.5575640921025473j)
22 Execution time: 0:00:23.859063 ovlp:
(0.632444211910739+0.5656089049742479j)
23 Execution time: 0:00:23.876841 ovlp:
(0.6039225662761061+0.5793081268930029j)
24 Execution time: 0:00:23.893651 ovlp:
(0.5747097195355513+0.5884761415618265j)
x_points = [np.float64(0.0), np.float64(0.20151673320850574),
np.float64(0.4030334664170115), np.float64(0.6045501996255173),
np.float64(0.806066932834023), np.float64(1.0075836660425288),
np.float64(1.2091003992510345), np.float64(1.4106171324595402),
np.float64(1.612133865668046), np.float64(1.8136505988765517),
np.float64(2.0151673320850576), np.float64(2.2166840652935633),
np.float64(2.418200798502069), np.float64(2.6197175317105748),
np.float64(2.8212342649190805), np.float64(3.022750998127586),
np.float64(3.224267731336092), np.float64(3.4257844645445976),
np.float64(3.6273011977531033), np.float64(3.828817930961609),
np.float64(4.030334664170115), np.float64(4.2318513973786205),
np.float64(4.433368130587127), np.float64(4.634884863795632),
np.float64(4.836401597004138)] y_points = [1.          +0.j
0.9989727983564773+0.03150245040392075j
0.9967263947622316+0.06800170880273404j
0.9917151867442988+0.09955695929113495j
0.9853311765298824+0.1346066153705845j
0.9771423634277814+0.16604666567466508j
0.967177547484076 +0.19943551909683066j
0.9565695305112487+0.23318917310267695j
0.9428415085464137+0.2661652258643614j
0.9307742892388629+0.29449487119179385j
0.9131486610378576+0.3201653122644996j
0.895292632468212 +0.3491477586364138j
0.8771486034377656+0.3762870020592033j
0.8557597692156307+0.40350304560487293j

```

0.8329597327355724+0.4276182841892546j
0.8092284947655917+0.4506679210686737j
0.7884540615264986+0.46880235008376014j
0.761353218165149 +0.4966807946892715j
0.7395323832518133+0.5080184128294605j
0.7139771423634278+0.5283512453619925j
0.6840922945476713+0.5435576696922715j
0.658239453183125 +0.5575640921025473j
0.632444211910739 +0.5656089049742479j
0.6039225662761061+0.5793081268930029j
0.5747097195355513+0.5884761415618265j]
fit1: [0.626682969229536 -0.2604932611474341]
[0.45635413773858946 -0.30179189145013585 0.40534329821186604
-0.07175800871119108] 4.425843280238006e-09
[0.4062504088924458 -0.31890943553157397 0.3389389415960442
-0.08659613915984524 -0.03665664932959826] 1.2692813923981047e-09
E_gs: -0.31890943553157397
test mps sampling took: (0.0013041496276855469, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.023778024772278892
1 Execution time: 0:00:24.576577 ovlp:
(0.99997119995392+0.003288005260808413j)
2 Execution time: 0:00:24.578625 ovlp:
(0.9999423999078398+0.011726418762270097j)
3 Execution time: 0:00:24.581264 ovlp:
(0.9998271997235195+0.011112017779228545j)
4 Execution time: 0:00:24.585067 ovlp:
(0.9997695996313594+0.017188827502123916j)
5 Execution time: 0:00:24.589023 ovlp:
(0.9996735994777592+0.0176400282240452j)
6 Execution time: 0:00:24.594272 ovlp:
(0.9995583992934389+0.027796844474951232j)
7 Execution time: 0:00:24.599405 ovlp:
(0.9993951990323184+0.02725924361478982j)
8 Execution time: 0:00:24.606316 ovlp:
(0.9990687985100777+0.03189605103368165j)
9 Execution time: 0:00:24.613452 ovlp:
(0.998838398141437+0.03312485299976475j)
10 Execution time: 0:00:24.620691 ovlp:
(0.9986271978035164+0.042369667791468446j)
11 Execution time: 0:00:24.628554 ovlp:
(0.9985503976806362+0.04355046968075138j)
12 Execution time: 0:00:24.637222 ovlp:
(0.9982527972044755+0.04771687634700217j)
13 Execution time: 0:00:24.646486 ovlp:


```

(0.9978879966207945+0.051921683074692915j)
14 Execution time: 0:00:24.657795 ovlp:
(0.9973215957145531+0.05548328877326214j)
15 Execution time: 0:00:24.669094 ovlp:
(0.9969375951001522+0.0650449040718466j)
16 Execution time: 0:00:24.682156 ovlp:
(0.9969567951308722+0.06042729668367475j)
17 Execution time: 0:00:24.694390 ovlp:
(0.9962751940403105+0.06640810625297j)
18 Execution time: 0:00:24.706896 ovlp:
(0.9959775935641497+0.07239851583762524j)
19 Execution time: 0:00:24.720113 ovlp:
(0.9955935929497488+0.07981932771092426j)
20 Execution time: 0:00:24.733887 ovlp:
(0.995324792519668+0.08133613013780816j)
21 Execution time: 0:00:24.748341 ovlp:
(0.9944607911372658+0.08342893348629365j)
22 Execution time: 0:00:24.765943 ovlp:
(0.9934911895859033+0.08624173798678081j)
23 Execution time: 0:00:24.781814 ovlp:
(0.9936543898470238+0.08980334368534981j)
24 Execution time: 0:00:24.800455 ovlp:
(0.9927327883724615+0.09273134837015728j)
x_points = [np.float64(0.0), np.float64(0.023778024772278892),
np.float64(0.047556049544557784), np.float64(0.07133407431683668),
np.float64(0.09511209908911557), np.float64(0.11889012386139446),
np.float64(0.14266814863367336), np.float64(0.16644617340595225),
np.float64(0.19022419817823114), np.float64(0.21400222295051002),
np.float64(0.2377802477227889), np.float64(0.2615582724950678),
np.float64(0.2853362972673467), np.float64(0.3091143220396256),
np.float64(0.3328923468119045), np.float64(0.35667037158418335),
np.float64(0.38044839635646227), np.float64(0.4042264211287412),
np.float64(0.42800444590102005), np.float64(0.45178247067329896),
np.float64(0.4755604954455778), np.float64(0.49933852021785674),
np.float64(0.5231165449901356), np.float64(0.5468945697624145),
np.float64(0.5706725945346934)] y_points = [1.          +0.j
0.99997119995392 +0.00328800526080841j
0.9999423999078398+0.0117264187622701j
0.9998271997235195+0.01111201777922854j
0.9997695996313594+0.01718882750212392j
0.9996735994777592+0.0176400282240452j
0.9995583992934389+0.02779684447495123j
0.9993951990323184+0.02725924361478982j
0.9990687985100777+0.03189605103368165j
0.998838398141437 +0.03312485299976475j
0.9986271978035164+0.04236966779146845j
0.9985503976806362+0.04355046968075138j

```

0.9982527972044755+0.04771687634700217j
0.9978879966207945+0.05192168307469291j
0.9973215957145531+0.05548328877326214j
0.9969375951001522+0.0650449040718466j
0.9969567951308722+0.06042729668367475j
0.9962751940403105+0.06640810625297j
0.9959775935641497+0.07239851583762524j
0.9955935929497488+0.07981932771092426j
0.995324792519668 +0.08133613013780816j
0.9944607911372658+0.08342893348629365j
0.9934911895859033+0.08624173798678081j
0.9936543898470238+0.08980334368534981j
0.9927327883724615+0.09273134837015728j]
fit1: [0.6181618815346752 -0.2736784877852293]
[0.6181618815346752 -0.2736784877852293 0.3818381184653248
-0.] 8.165507525158187e-10
[5.4171120995369870e-01 -2.5471924361388959e-01
3.4252719136724130e-01
-9.1043398002261883e-02 1.0655544299754232e-06]
8.623287484828723e-10
E_gs: -0.2547192436138896
test mps sampling took: (0.0012636184692382812, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1673932292185687
1 Execution time: 0:00:25.631780 ovlp:
(0.999391997932793+0.02822269595716631j)
2 Execution time: 0:00:25.633717 ovlp:
(0.9976743920929332+0.053865183141622586j)
3 Execution time: 0:00:25.636441 ovlp:
(0.9945127813434567+0.0837712848223684j)
4 Execution time: 0:00:25.640072 ovlp:
(0.9902415668213271+0.11189898045653357j)
5 Execution time: 0:00:25.644136 ovlp:
(0.9847467481389436+0.13646226397169747j)
6 Execution time: 0:00:25.649027 ovlp:
(0.9774507233324594+0.16663436655684638j)
7 Execution time: 0:00:25.654243 ovlp:
(0.9695010963037274+0.19136485064049213j)
8 Execution time: 0:00:25.660033 ovlp:
(0.9601530645204193+0.22092895115843403j)
9 Execution time: 0:00:25.666755 ovlp:
(0.9502122307215846+0.2482282439760295j)
10 Execution time: 0:00:25.673919 ovlp:
(0.9370565859923923+0.27147672302085835j)
11 Execution time: 0:00:25.682018 ovlp:

```

(0.926044148550105+0.29471000201400677j)
12 Execution time: 0:00:25.690724 ovlp:
(0.9130177042601946+0.3204664895860645j)
13 Execution time: 0:00:25.701119 ovlp:
(0.8996796589108402+0.3429777661244049j)
14 Execution time: 0:00:25.712122 ovlp:
(0.8841528061195407+0.3664162458152358j)
15 Execution time: 0:00:25.722759 ovlp:
(0.8670907481085435+0.38968752493758485j)
16 Execution time: 0:00:25.734767 ovlp:
(0.848706285601371+0.4092651915016512j)
17 Execution time: 0:00:25.746919 ovlp:
(0.8312490262466892+0.43000566201925094j)
18 Execution time: 0:00:25.761270 ovlp:
(0.8116637596567828+0.4448865126141428j)
19 Execution time: 0:00:25.774602 ovlp:
(0.7928764957800856+0.4689025942688205j)
x_points = [np.float64(0.0), np.float64(0.1673932292185687),
np.float64(0.3347864584371374), np.float64(0.5021796876557061),
np.float64(0.6695729168742748), np.float64(0.8369661460928435),
np.float64(1.0043593753114122), np.float64(1.1717526045299809),
np.float64(1.3391458337485496), np.float64(1.5065390629671183),
np.float64(1.673932292185687), np.float64(1.8413255214042556),
np.float64(2.0087187506228243), np.float64(2.176111979841393),
np.float64(2.3435052090599617), np.float64(2.5108984382785304),
np.float64(2.678291667497099), np.float64(2.845684896715668),
np.float64(3.0130781259342365), np.float64(3.180471355152805)] y_points =
[1.          +0.j
 0.999391997932793 +0.02822269595716631j
 0.9976743920929332+0.05386518314162259j
 0.9945127813434567+0.0837712848223684j
 0.9902415668213271+0.11189898045653357j
 0.9847467481389436+0.13646226397169747j
 0.9774507233324594+0.16663436655684638j
 0.9695010963037274+0.19136485064049213j
 0.9601530645204193+0.22092895115843403j
 0.9502122307215846+0.2482282439760295j
 0.9370565859923923+0.27147672302085835j
 0.926044148550105 +0.29471000201400677j
 0.9130177042601946+0.3204664895860645j
 0.8996796589108402+0.3429777661244049j
 0.8841528061195407+0.3664162458152358j
 0.8670907481085435+0.38968752493758485j
 0.848706285601371 +0.4092651915016512j
 0.8312490262466892+0.43000566201925094j
 0.8116637596567828+0.4448865126141428j
 0.7928764957800856+0.4689025942688205j ]

```

```

fit1: [ 0.6281350714105655 -0.2646083711004895]
[ 0.6281350714105655 -0.2646083711004895  0.37186492858943454
 -0.          ] 5.938508763463965e-10
[ 5.0751849803391869e-01 -2.9163769006366519e-01
 3.3485196057831912e-01
 -5.7574111163675716e-02 -6.9459285754291658e-07]
2.4246131997792187e-10
E_gs: -0.2916376900636652
test mps sampling took: (0.0012862682342529297, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.04732105146687029
1 Execution time: 0:00:26.180404 ovlp:
(0.9999567999827199+0.008348403339361266j)
2 Execution time: 0:00:26.182333 ovlp:
(0.99981519992608+0.01615080646032263j)
3 Execution time: 0:00:26.185166 ovlp:
(0.9995319998127998+0.02612761045104417j)
4 Execution time: 0:00:26.188960 ovlp:
(0.9991431996572799+0.03205081282032518j)
5 Execution time: 0:00:26.192934 ovlp:
(0.9988071995228798+0.040806016322406435j)
6 Execution time: 0:00:26.198107 ovlp:
(0.9981999992799997+0.0469404187761675j)
x_points = [np.float64(0.0), np.float64(0.04732105146687029),
np.float64(0.09464210293374058), np.float64(0.14196315440061086),
np.float64(0.18928420586748115), np.float64(0.23660525733435145),
np.float64(0.2839263088012217)] y_points = [1.          +0.j
0.9999567999827199+0.00834840333936127j
0.99981519992608 +0.01615080646032263j
0.9995319998127998+0.02612761045104417j
0.9991431996572799+0.03205081282032518j
0.9988071995228798+0.04080601632240644j
0.9981999992799997+0.0469404187761675j ]
fit1: [ 0.34238375554035244 -0.5135458621747575 ]
[ 0.34238375554035244 -0.5135458621747575  0.34239375544035244
 -0.          ] 6.88804976308051e-11
[ 2.9437350699053477e-01 -4.4162571251676186e-01
 2.9436271011379389e-01
 -1.5149985398279708e-01  1.4024684882873616e-06]
2.7104772092396737e-11
E_gs: -0.44162571251676186
test mps sampling took: (0.0013270378112792969, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 172 2 qubit gates: 80

```

N gate: 172 dt: 0.005283683066828852

1 Execution time: 0:00:26.673394 ovlp: (1-0.0005896018867260766j)

2 Execution time: 0:00:26.675501 ovlp: (1+0.0036080115456369466j)

3 Execution time: 0:00:26.678099 ovlp:

(0.9999911999718398+0.004919215741490346j)

4 Execution time: 0:00:26.681423 ovlp: (1+0.005852018726459907j)

5 Execution time: 0:00:26.685351 ovlp:

(0.9999735999155197+0.001188003801612103j)

6 Execution time: 0:00:26.689813 ovlp:

(0.9999911999718398+0.0037576120243585365j)

7 Execution time: 0:00:26.695087 ovlp:

(0.9999911999718398+0.007207223063113721j)

8 Execution time: 0:00:26.700935 ovlp:

(0.9999735999155197+0.004408814108205039j)

9 Execution time: 0:00:26.708327 ovlp:

(0.9999471998310394+0.00602801928966179j)

10 Execution time: 0:00:26.716673 ovlp:

(0.9999383998028795+0.008016825653841986j)

11 Execution time: 0:00:26.724847 ovlp:

(0.9999735999155197+0.009002428807772134j)

12 Execution time: 0:00:26.733473 ovlp:

(0.9999119997183992+0.00974163117321969j)

13 Execution time: 0:00:26.742723 ovlp:

(0.9998767996057587+0.012073638635643702j)

14 Execution time: 0:00:26.754128 ovlp:

(0.9998943996620788+0.01082403463691084j)

15 Execution time: 0:00:26.765489 ovlp:

(0.9998151994086382+0.010049632158822819j)

16 Execution time: 0:00:26.777818 ovlp:

(0.9998415994931185+0.01685205392657263j)

17 Execution time: 0:00:26.790062 ovlp:

(0.9998415994931185+0.016033651307684194j)

18 Execution time: 0:00:26.804724 ovlp:

(0.9998327994649583+0.01701925446161434j)

19 Execution time: 0:00:26.818430 ovlp:

(0.9997623992396776+0.0205744658382907j)

20 Execution time: 0:00:26.833027 ovlp:

(0.9996831989862367+0.01793445739026356j)

21 Execution time: 0:00:26.847715 ovlp:

(0.9997623992396776+0.020592065894610823j)

22 Execution time: 0:00:26.865258 ovlp:

(0.9996567989017564+0.019685662994121556j)

x_points = [np.float64(0.0), np.float64(0.005283683066828852),
np.float64(0.010567366133657705), np.float64(0.015851049200486557),
np.float64(0.02113473226731541), np.float64(0.02641841533414426),
np.float64(0.031702098400973114), np.float64(0.036985781467801966),
np.float64(0.04226946453463082), np.float64(0.04755314760145967),

```

np.float64(0.05283683066828852), np.float64(0.058120513735117375),
np.float64(0.06340419680194623), np.float64(0.06868787986877509),
np.float64(0.07397156293560393), np.float64(0.07925524600243278),
np.float64(0.08453892906926164), np.float64(0.0898226121360905),
np.float64(0.09510629520291934), np.float64(0.10038997826974819),
np.float64(0.10567366133657705), np.float64(0.1109573444034059),
np.float64(0.11624102747023475)] y_points = [1.          +0.j
1.          -0.00058960188672608j
1.          +0.00360801154563695j
0.9999911999718398+0.00491921574149035j
1.          +0.00585201872645991j
0.9999735999155197+0.0011880038016121j
0.9999911999718398+0.00375761202435854j
0.9999911999718398+0.00720722306311372j
0.9999735999155197+0.00440881410820504j
0.9999471998310394+0.00602801928966179j
0.9999383998028795+0.00801682565384199j
0.9999735999155197+0.00900242880777213j
0.9999119997183992+0.00974163117321969j
0.9998767996057587+0.0120736386356437j
0.9998943996620788+0.01082403463691084j
0.9998151994086382+0.01004963215882282j
0.9998415994931185+0.01685205392657263j
0.9998415994931185+0.01603365130768419j
0.9998327994649583+0.01701925446161434j
0.9997623992396776+0.0205744658382907j
0.9996831989862367+0.01793445739026356j
0.9997623992396776+0.02059206589461082j
0.9996567989017564+0.01968566299412156j]
fit1: [ 0.15133790974294906 -1.1412910199414483 ]
[ 0.15133790974294906 -1.1412910199414483  0.15134790964294906
-0.          ] 3.3042709798383124e-10
[ 1.3430052574432189e-01 -1.0143610335182283e+00
1.3418528925877857e-01
-4.0260305161773863e-01  1.1420949333547721e-06]
7.148972000215255e-10
E_gs: -1.0143610335182283
test mps sampling took: (0.0013165473937988281, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 10
shots per matrix element: 555555.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.02097232415987533
1 Execution time: 0:00:27.104280 ovlp:
(0.9999927999928+0.0028170028170029227j)
2 Execution time: 0:00:27.106240 ovlp:
(0.9999783999784+0.006244206244206296j)
3 Execution time: 0:00:27.108839 ovlp:

```

```

(0.9999171999171999+0.007835407835407926j)
4 Execution time: 0:00:27.112168 ovlp:
(0.9998775998775999+0.016241416241416173j)
5 Execution time: 0:00:27.115997 ovlp:
(0.9997407997407997+0.016662616662616703j)
6 Execution time: 0:00:27.120468 ovlp:
(0.9996327996327996+0.020147420147420103j)
7 Execution time: 0:00:27.125688 ovlp:
(0.9995139995139994+0.022033822033822092j)
8 Execution time: 0:00:27.131416 ovlp:
(0.9993951993951995+0.0272754272754272j)
9 Execution time: 0:00:27.138758 ovlp:
(0.9992079992079992+0.02850662850662844j)
x_points = [np.float64(0.0), np.float64(0.02097232415987533),
np.float64(0.04194464831975066), np.float64(0.062916972479626),
np.float64(0.08388929663950132), np.float64(0.10486162079937664),
np.float64(0.125833944959252), np.float64(0.1468062691191273),
np.float64(0.16777859327900263), np.float64(0.18875091743887795)]
y_points = [1.          +0.j
0.9999927999928  +0.00281700281700292j
0.9999783999784  +0.0062442062442063j
0.9999171999171999+0.00783540783540793j
0.9998775998775999+0.01624141624141617j
0.9997407997407997+0.0166626166626167j
0.9996327996327996+0.0201474201474201j
0.9995139995139994+0.02203382203382209j
0.9993951993951995+0.0272754272754272j
0.9992079992079992+0.02850662850662844j]
fit1: [ 0.5729378911367767 -0.2864851064019175]
[ 0.5729378911367767 -0.2864851064019175  0.42706210886322327
-0.          ] 6.545432274868649e-11
[ 5.2743381856878979e-01 -2.5203405636555554e-01
4.0187048181942597e-01
-1.0289296180680069e-01  3.8548466742271780e-07]
3.3145979591652866e-10
E_gs: -0.25203405636555554
test mps sampling took: (0.0012972354888916016, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2276793452118666
1 Execution time: 0:00:27.439586 ovlp:
(0.998896+0.035576000000000005j)
2 Execution time: 0:00:27.441518 ovlp:
(0.9954719999999999+0.078416000000000004j)
3 Execution time: 0:00:27.444091 ovlp:
(0.9888159999999999+0.11671199999999993j)

```

```

4 Execution time: 0:00:27.447262  ovlp: (0.981536+0.151488000000000007j)
5 Execution time: 0:00:27.451176  ovlp:
(0.971680000000000001+0.188895999999999995j)
6 Execution time: 0:00:27.455636  ovlp:
(0.959344+0.222895999999999998j)
7 Execution time: 0:00:27.460789  ovlp: (0.94588+0.258528000000000001j)
8 Execution time: 0:00:27.467239  ovlp: (0.92843199999999999+0.291312j)
9 Execution time: 0:00:27.474524  ovlp: (0.911152+0.32651199999999999j)
10 Execution time: 0:00:27.482368  ovlp:
(0.888952+0.359744000000000006j)
11 Execution time: 0:00:27.491072  ovlp:
(0.86671199999999999+0.387952000000000001j)
12 Execution time: 0:00:27.501019  ovlp: (0.84256+0.418752j)
13 Execution time: 0:00:27.511860  ovlp: (0.81932+0.445264000000000001j)
14 Execution time: 0:00:27.523086  ovlp:
(0.79024+0.468431999999999996j)
15 Execution time: 0:00:27.535161  ovlp:
(0.76503999999999999+0.491824000000000004j)
16 Execution time: 0:00:27.548655  ovlp: (0.734488+0.510616j)
17 Execution time: 0:00:27.562082  ovlp:
(0.70526399999999999+0.528024j)
18 Execution time: 0:00:27.575890  ovlp:
(0.675144+0.54477599999999999j)
19 Execution time: 0:00:27.589264  ovlp: (0.6492+0.561088j)
20 Execution time: 0:00:27.603969  ovlp: (0.61328+0.574704000000000001j)
x_points = [np.float64(0.0), np.float64(0.2276793452118666),
np.float64(0.4553586904237332), np.float64(0.6830380356355998),
np.float64(0.9107173808474665), np.float64(1.138396726059333),
np.float64(1.3660760712711997), np.float64(1.5937554164830663),
np.float64(1.821434761694933), np.float64(2.0491141069067993),
np.float64(2.276793452118666), np.float64(2.504472797330533),
np.float64(2.7321521425423994), np.float64(2.9598314877542657),
np.float64(3.1875108329661326), np.float64(3.4151901781779994),
np.float64(3.642869523389866), np.float64(3.870548868601732),
np.float64(4.098228213813599), np.float64(4.325907559025466),
np.float64(4.553586904237332)] y_points = [1.          +0.j
0.998896          +0.035576000000000005j
0.9954719999999999+0.078416000000000004j
0.9888159999999999+0.116711999999999993j
0.981536          +0.151488000000000007j
0.971680000000000001+0.188895999999999995j
0.959344          +0.222895999999999998j
0.94588          +0.258528000000000001j
0.92843199999999999+0.291312j
0.911152          +0.32651199999999999j
0.888952          +0.359744000000000006j
0.86671199999999999+0.387952000000000001j

```


0.84256 +0.418752j
0.81932 +0.44526400000000001j
0.79024 +0.468431999999999996j
0.76503999999999999+0.491824000000000004j
0.734488 +0.510616j
0.70526399999999999+0.528024j
0.675144 +0.54477599999999999j
0.6492 +0.561088j
0.61328 +0.57470400000000001j]
fit1: [0.6274159486714777 -0.2609822788012146]
[0.4817059947406249 -0.2956415181884615 0.39082810583668465
-0.06163152592124879] 3.310927299749055e-09
[0.41916387391301485 -0.31450991829708447 0.3394219080523188
-0.08362116133916107 -0.03132925335007956] 9.721703316684806e-10
E_gs: -0.31450991829708447
test mps sampling took: (0.0012869834899902344, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.08987443578447045
1 Execution time: 0:00:28.174080 ovlp:
(0.9997607996651194+0.01392421949390732j)
2 Execution time: 0:00:28.176072 ovlp:
(0.9992271989180785+0.03357544700562576j)
3 Execution time: 0:00:28.178807 ovlp:
(0.9982887976043167+0.04838746774245495j)
4 Execution time: 0:00:28.182497 ovlp:
(0.9972859962003946+0.06092708529791935j)
5 Execution time: 0:00:28.186788 ovlp:
(0.995418393585751+0.07660390724547006j)
6 Execution time: 0:00:28.191727 ovlp:
(0.9936243910741476+0.09137912793077918j)
7 Execution time: 0:00:28.197604 ovlp:
(0.990790787107102+0.10193154270415983j)
8 Execution time: 0:00:28.204751 ovlp:
(0.9880491832688565+0.12156437019011834j)
9 Execution time: 0:00:28.211938 ovlp:
(0.9853443794821313+0.1345179883251837j)
10 Execution time: 0:00:28.219177 ovlp:
(0.9819587747422847+0.15060881085233513j)
11 Execution time: 0:00:28.227191 ovlp:
(0.9782419695387574+0.16911003675405145j)
12 Execution time: 0:00:28.235782 ovlp:
(0.97450676430947+0.17670924739294636j)
13 Execution time: 0:00:28.245880 ovlp:
(0.9703391584748218+0.19776807687530762j)
14 Execution time: 0:00:28.257226 ovlp:

```

(0.9643499500899302+0.2070692898970059j)
15 Execution time: 0:00:28.267841 ovlp:
(0.9604491446288024+0.22137530992543386j)
16 Execution time: 0:00:28.279064 ovlp:
(0.9544967362954309+0.23839533375346722j)
17 Execution time: 0:00:28.291828 ovlp:
(0.9501267301774223+0.2551853572595002j)
18 Execution time: 0:00:28.306217 ovlp:
(0.9436683211356496+0.26214976700967374j)
19 Execution time: 0:00:28.319688 ovlp:
(0.9371639120294768+0.2750481850674591j)
20 Execution time: 0:00:28.336384 ovlp:
(0.9293347010685815+0.29190260866365203j)
21 Execution time: 0:00:28.353663 ovlp:
(0.9240998937398512+0.3022342231279125j)
22 Execution time: 0:00:28.369681 ovlp:
(0.9154610816455142+0.31666904333666057j)
23 Execution time: 0:00:28.386889 ovlp:
(0.9084414718180605+0.3308278631590085j)
x_points = [np.float64(0.0), np.float64(0.08987443578447045),
np.float64(0.1797488715689409), np.float64(0.26962330735341133),
np.float64(0.3594977431378818), np.float64(0.44937217892235226),
np.float64(0.5392466147068227), np.float64(0.6291210504912932),
np.float64(0.7189954862757636), np.float64(0.808869922060234),
np.float64(0.8987443578447045), np.float64(0.9886187936291749),
np.float64(1.0784932294136453), np.float64(1.1683676651981159),
np.float64(1.2582421009825864), np.float64(1.3481165367670567),
np.float64(1.4379909725515272), np.float64(1.5278654083359977),
np.float64(1.617739844120468), np.float64(1.7076142799049385),
np.float64(1.797488715689409), np.float64(1.8873631514738793),
np.float64(1.9772375872583499), np.float64(2.0671120230428204)] y_points
= [1.          +0.j
0.9997607996651194+0.01392421949390732j
0.9992271989180785+0.03357544700562576j
0.9982887976043167+0.04838746774245495j
0.9972859962003946+0.06092708529791935j
0.995418393585751 +0.07660390724547006j
0.9936243910741476+0.09137912793077918j
0.990790787107102 +0.10193154270415983j
0.9880491832688565+0.12156437019011834j
0.9853443794821313+0.1345179883251837j
0.9819587747422847+0.15060881085233513j
0.9782419695387574+0.16911003675405145j
0.97450676430947  +0.17670924739294636j
0.9703391584748218+0.19776807687530762j
0.9643499500899302+0.2070692898970059j
0.9604491446288024+0.22137530992543386j

```

0.9544967362954309+0.23839533375346722j
 0.9501267301774223+0.2551853572595002j
 0.9436683211356496+0.26214976700967374j
 0.9371639120294768+0.2750481850674591j
 0.9293347010685815+0.29190260866365203j
 0.9240998937398512+0.3022342231279125j
 0.9154610816455142+0.31666904333666057j
 0.9084414718180605+0.3308278631590085j]
 fit1: [0.6467587802965016 -0.26075939937797343]
 [0.6467587802965016 -0.26075939937797343 0.3532412197034984
 -0.] 8.664460811875985e-10
 [5.3404381838881276e-01 -2.8565541241106224e-01
 2.8652937892064134e-01
 -5.7485415469202758e-02 1.9396026206748089e-06]
 8.372223734625277e-10
 E_gs: -0.28565541241106224
 test mps sampling took: (0.0012738704681396484, Counter({2: 6, 0: 4}))
 truncated ham size: 10 Number of fitting points: 25
 shots per matrix element: 208333.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.012408861515488007
 1 Execution time: 0:00:28.796673 ovlp:
 (0.99999039998464+8.160013056013327e-05j)
 2 Execution time: 0:00:28.798616 ovlp:
 (0.99998079996928+0.0037872060595296464j)
 3 Execution time: 0:00:28.801193 ovlp:
 (0.99997119995392+0.009873615797785229j)
 4 Execution time: 0:00:28.804922 ovlp:
 (0.9999519999231998+0.007224011558418564j)
 5 Execution time: 0:00:28.809049 ovlp:
 (0.9999519999231998+0.007348811758098872j)
 6 Execution time: 0:00:28.813942 ovlp:
 (0.9998847998156797+0.014001622402595837j)
 7 Execution time: 0:00:28.819543 ovlp:
 (0.9997695996313594+0.012648020236832425j)
 8 Execution time: 0:00:28.826600 ovlp:
 (0.9997791996467194+0.015652825044520036j)
 9 Execution time: 0:00:28.833952 ovlp:
 (0.999663999462399+0.018830430128688125j)
 10 Execution time: 0:00:28.841115 ovlp:
 (0.999663999462399+0.022795236472378466j)
 11 Execution time: 0:00:28.848924 ovlp:
 (0.9996255994009591+0.024427239083582464j)
 12 Execution time: 0:00:28.857545 ovlp:
 (0.9995007992012788+0.02323683717893954j)
 13 Execution time: 0:00:28.868042 ovlp:
 (0.9994911991859188+0.02556004089606545j)

```

14 Execution time: 0:00:28.879337  ovlp:
(0.9993183989094383+0.030110448176717153j)
15 Execution time: 0:00:28.891970  ovlp:
(0.999193598709758+0.03412325459720744j)
16 Execution time: 0:00:28.904074  ovlp:
(0.9989151982643172+0.03030244848391761j)
17 Execution time: 0:00:28.918862  ovlp:
(0.9990399984639975+0.03911526258442022j)
18 Execution time: 0:00:28.932427  ovlp:
(0.9988863982182372+0.03514085622536989j)
19 Execution time: 0:00:28.947749  ovlp:
(0.9988191981107171+0.03745445992713581j)
20 Execution time: 0:00:28.961617  ovlp:
(0.9986655978649566+0.04057446491914396j)
21 Execution time: 0:00:28.976097  ovlp:
(0.998396797434876+0.04460647137035423j)
22 Execution time: 0:00:28.993782  ovlp:
(0.9983775974041558+0.04612327379723813j)
23 Execution time: 0:00:29.011906  ovlp:
(0.9980895969433552+0.0467184747495597j)
24 Execution time: 0:00:29.031794  ovlp:
(0.9978687965900745+0.049550479280766835j)
x_points = [np.float64(0.0), np.float64(0.012408861515488007),
np.float64(0.024817723030976013), np.float64(0.03722658454646402),
np.float64(0.04963544606195203), np.float64(0.06204430757744003),
np.float64(0.07445316909292804), np.float64(0.08686203060841605),
np.float64(0.09927089212390405), np.float64(0.11167975363939206),
np.float64(0.12408861515488007), np.float64(0.13649747667036807),
np.float64(0.14890633818585608), np.float64(0.1613151997013441),
np.float64(0.1737240612168321), np.float64(0.1861329227323201),
np.float64(0.1985417842478081), np.float64(0.2109506457632961),
np.float64(0.22335950727878412), np.float64(0.23576836879427213),
np.float64(0.24817723030976013), np.float64(0.26058609182524817),
np.float64(0.27299495334073615), np.float64(0.2854038148562241),
np.float64(0.29781267637171216)] y_points = [1.
+0.000000000000000000e+00j
0.99999039998464 +8.1600130560133266e-05j
0.99998079996928 +3.7872060595296464e-03j
0.99997119995392 +9.8736157977852290e-03j
0.9999519999231998+7.2240115584185638e-03j
0.9999519999231998+7.3488117580988721e-03j
0.9998847998156797+1.4001622402595837e-02j
0.9997695996313594+1.2648020236832425e-02j
0.9997791996467194+1.5652825044520036e-02j
0.999663999462399 +1.8830430128688125e-02j
0.999663999462399 +2.2795236472378466e-02j
0.9996255994009591+2.4427239083582464e-02j

```

```

0.9995007992012788+2.3236837178939540e-02j
0.9994911991859188+2.5560040896065450e-02j
0.9993183989094383+3.0110448176717153e-02j
0.999193598709758 +3.4123254597207442e-02j
0.9989151982643172+3.0302448483917610e-02j
0.9990399984639975+3.9115262584420218e-02j
0.9988863982182372+3.5140856225369888e-02j
0.9988191981107171+3.7454459927135808e-02j
0.9986655978649566+4.0574464919143960e-02j
0.998396797434876 +4.4606471370354228e-02j
0.9983775974041558+4.6123273797238129e-02j
0.9980895969433552+4.6718474749559702e-02j
0.9978687965900745+4.9550479280766835e-02j]
fit1: [ 0.5797018099458034 -0.2898566929790311]
[ 0.5797018099458034 -0.2898566929790311 0.42029819005419655
-0.          ] 3.6510701517120104e-10
[ 5.1578312522063807e-01 -2.4678741310020397e-01
3.8200625989340481e-01
-1.0567143595960955e-01 7.1948486444443204e-07]
3.7036469203363714e-10
E_gs: -0.24678741310020397
test mps sampling took: (0.0012979507446289062, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.10417464164156762
1 Execution time: 0:00:29.613799 ovlp:
(0.9997879999999999+0.014871999999999996j)
2 Execution time: 0:00:29.615772 ovlp:
(0.9990239999999999+0.035652000000000002j)
3 Execution time: 0:00:29.618348 ovlp:
(0.99794+0.0533920000000000106j)
4 Execution time: 0:00:29.622101 ovlp:
(0.996448+0.069299999999999992j)
5 Execution time: 0:00:29.626136 ovlp:
(0.99398800000000001+0.088424000000000006j)
6 Execution time: 0:00:29.631164 ovlp:
(0.9912799999999999+0.10461199999999993j)
7 Execution time: 0:00:29.636896 ovlp:
(0.98840400000000001+0.122640000000000008j)
8 Execution time: 0:00:29.643003 ovlp:
(0.98442000000000001+0.13919600000000001j)
9 Execution time: 0:00:29.649764 ovlp: (0.9802+0.154544000000000001j)
10 Execution time: 0:00:29.656992 ovlp:
(0.97642000000000001+0.17186799999999999j)
x_points = [np.float64(0.0), np.float64(0.10417464164156762),
np.float64(0.20834928328313523), np.float64(0.3125239249247028),

```

```

np.float64(0.41669856656627047), np.float64(0.5208732082078381),
np.float64(0.6250478498494056), np.float64(0.7292224914909733),
np.float64(0.8333971331325409), np.float64(0.9375717747741086),
np.float64(1.0417464164156762)] y_points = [1.          +0.j
0.9997879999999999+0.014872j
0.9990239999999999+0.035652000000000002j
0.99794          +0.0533920000000000011j
0.996448          +0.069299999999999992j
0.99398800000000001+0.088424000000000006j
0.9912799999999999+0.104611999999999993j
0.98840400000000001+0.122640000000000008j
0.98442000000000001+0.139196000000000001j
0.9802          +0.1545440000000000001j
0.97642000000000001+0.17186799999999999j ]
fit1: [ 0.5861381352225494 -0.2866368279279896]
[ 0.5861381352225494 -0.2866368279279896  0.41386186477745057
-0.          ] 5.115238228325667e-11
[ 5.0064462721772796e-01 -2.6607512898902513e-01
3.5676863673369918e-01
-9.8064895880846034e-02  2.2390868739952383e-06]
1.4287647240370096e-10
E_gs: -0.26607512898902513
test mps sampling took: (0.0012881755828857422, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.22550309927540915
1 Execution time: 0:00:30.180162 ovlp:
(0.9989104+0.037718399999999993j)
2 Execution time: 0:00:30.182132 ovlp:
(0.9954255999999999+0.0773024j)
3 Execution time: 0:00:30.184684 ovlp:
(0.9899616+0.113547199999999996j)
4 Execution time: 0:00:30.187837 ovlp:
(0.9818688+0.150796799999999995j)
x_points = [np.float64(0.0), np.float64(0.22550309927540915),
np.float64(0.4510061985508183), np.float64(0.6765092978262275),
np.float64(0.9020123971016366)] y_points = [1.          +0.j
0.9989104          +0.037718399999999993j
0.9954255999999999+0.0773024j
0.9899616          +0.113547199999999996j
0.9818688          +0.150796799999999995j]
fit1: [ 0.5846513370083399 -0.29226093206690923]
[ 0.5846513370083399 -0.29226093206690923  0.41534866299166007
-0.          ] 2.879370122760609e-11
[ 5.2319335552915802e-01 -2.5220000582000029e-01
3.7841172261343753e-01

```

```

-9.8895501310117179e-02 7.2008698538354457e-07]
6.335389581182143e-11
E_gs: -0.2522000058200003
test mps sampling took: (0.0013053417205810547, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.22824188648823265
1 Execution time: 0:00:30.561312 ovlp:
(0.9988779988779988+0.038572638572638596j)
2 Execution time: 0:00:30.563281 ovlp:
(0.9954679954679955+0.07540507540507546j)
3 Execution time: 0:00:30.565929 ovlp:
(0.9896379896379897+0.11393151393151402j)
4 Execution time: 0:00:30.569321 ovlp:
(0.9811987811987812+0.14940874940874949j)
5 Execution time: 0:00:30.573246 ovlp:
(0.9708719708719709+0.1857483857483857j)
6 Execution time: 0:00:30.577803 ovlp:
(0.959066759066759+0.22292842292842296j)
7 Execution time: 0:00:30.582960 ovlp:
(0.9442035442035441+0.26321046321046326j)
8 Execution time: 0:00:30.588713 ovlp:
(0.9278179278179277+0.2933856933856933j)
9 Execution time: 0:00:30.596138 ovlp:
(0.9103191103191104+0.32581812581812586j)
10 Execution time: 0:00:30.604496 ovlp:
(0.889005489005489+0.35741895741895746j)
11 Execution time: 0:00:30.612741 ovlp:
(0.8672210672210672+0.38793738793738797j)
x_points = [np.float64(0.0), np.float64(0.22824188648823265),
np.float64(0.4564837729764653), np.float64(0.684725659464698),
np.float64(0.9129675459529306), np.float64(1.1412094324411632),
np.float64(1.369451318929396), np.float64(1.5976932054176285),
np.float64(1.8259350919058612), np.float64(2.0541769783940937),
np.float64(2.2824188648823265), np.float64(2.510660751370559)] y_points
= [1.          +0.j
0.9988779988779988+0.0385726385726386j
0.9954679954679955+0.07540507540507546j
0.9896379896379897+0.11393151393151402j
0.9811987811987812+0.14940874940874949j
0.9708719708719709+0.1857483857483857j
0.959066759066759 +0.22292842292842296j
0.9442035442035441+0.26321046321046326j
0.9278179278179277+0.2933856933856933j
0.9103191103191104+0.32581812581812586j
0.889005489005489 +0.35741895741895746j

```

0.8672210672210672+0.38793738793738797j]
 fit1: [0.63584845058749 -0.2632139302546705]
 [0.63584845058749 -0.2632139302546705 0.36415154941251004
 -0.] 1.5283716204580928e-10
 [5.0008270860189807e-01 -2.9158015063098019e-01
 3.0349690881178848e-01
 -7.2828419215522883e-02 1.5282081758596573e-06]
 1.2877873451156778e-10
 E_gs: -0.2915801506309802
 test mps sampling took: (0.0013256072998046875, Counter({0: 6, 2: 4}))
 truncated ham size: 10 Number of fitting points: 22
 shots per matrix element: 238095.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.11834367945395441
 1 Execution time: 0:00:31.011097 ovlp:
 (0.9996471996471996+0.020290220290220207j)
 2 Execution time: 0:00:31.013143 ovlp:
 (0.9986895986895987+0.03909783909783915j)
 3 Execution time: 0:00:31.015742 ovlp:
 (0.9973455973455974+0.05977025977025985j)
 4 Execution time: 0:00:31.019418 ovlp:
 (0.9952287952287953+0.07750267750267748j)
 5 Execution time: 0:00:31.023441 ovlp:
 (0.9917175917175918+0.09872109872109869j)
 6 Execution time: 0:00:31.028392 ovlp:
 (0.9887691887691887+0.11758751758751762j)
 7 Execution time: 0:00:31.034092 ovlp:
 (0.9851655851655852+0.1368403368403368j)
 8 Execution time: 0:00:31.040314 ovlp:
 (0.9801339801339801+0.1565047565047566j)
 9 Execution time: 0:00:31.046952 ovlp:
 (0.9747075747075746+0.17826917826917832j)
 10 Execution time: 0:00:31.054140 ovlp:
 (0.9685587685587687+0.19250719250719261j)
 11 Execution time: 0:00:31.062163 ovlp:
 (0.9622587622587622+0.21470841470841462j)
 12 Execution time: 0:00:31.070904 ovlp:
 (0.9569415569415569+0.23265923265923272j)
 13 Execution time: 0:00:31.080972 ovlp:
 (0.9486255486255486+0.25184485184485195j)
 14 Execution time: 0:00:31.092095 ovlp:
 (0.9411411411411412+0.27036687036687046j)
 15 Execution time: 0:00:31.103060 ovlp:
 (0.932976332976333+0.2866208866208866j)
 16 Execution time: 0:00:31.116659 ovlp:
 (0.9222579222579224+0.30271530271530267j)
 17 Execution time: 0:00:31.129115 ovlp:


```

(0.9117495117495118+0.3181965181965183j)
18 Execution time: 0:00:31.141632 ovlp:
(0.9023583023583024+0.337062937062937j)
19 Execution time: 0:00:31.156814 ovlp:
(0.8914634914634914+0.3542913542913544j)
20 Execution time: 0:00:31.172072 ovlp:
(0.8811566811566811+0.37161217161217164j)
21 Execution time: 0:00:31.190432 ovlp:
(0.8695478695478696+0.3858249858249858j)
x_points = [np.float64(0.0), np.float64(0.11834367945395441),
np.float64(0.23668735890790882), np.float64(0.3550310383618632),
np.float64(0.47337471781581764), np.float64(0.591718397269772),
np.float64(0.7100620767237265), np.float64(0.8284057561776809),
np.float64(0.9467494356316353), np.float64(1.0650931150855896),
np.float64(1.183436794539544), np.float64(1.3017804739934986),
np.float64(1.420124153447453), np.float64(1.5384678329014072),
np.float64(1.6568115123553617), np.float64(1.7751551918093162),
np.float64(1.8934988712632705), np.float64(2.011842550717225),
np.float64(2.130186230171179), np.float64(2.248529909625134),
np.float64(2.366873589079088), np.float64(2.4852172685330425)] y_points
= [1.          +0.j
0.9996471996471996+0.02029022029022021j
0.9986895986895987+0.03909783909783915j
0.9973455973455974+0.05977025977025985j
0.9952287952287953+0.07750267750267748j
0.9917175917175918+0.09872109872109869j
0.9887691887691887+0.11758751758751762j
0.9851655851655852+0.1368403368403368j
0.9801339801339801+0.1565047565047566j
0.9747075747075746+0.17826917826917832j
0.9685587685587687+0.19250719250719261j
0.9622587622587622+0.21470841470841462j
0.9569415569415569+0.23265923265923272j
0.9486255486255486+0.25184485184485195j
0.9411411411411412+0.27036687036687046j
0.932976332976333 +0.2866208866208866j
0.9222579222579224+0.30271530271530267j
0.9117495117495118+0.3181965181965183j
0.9023583023583024+0.337062937062937j
0.8914634914634914+0.3542913542913544j
0.8811566811566811+0.37161217161217164j
0.8695478695478696+0.3858249858249858j ]
fit1: [ 0.631613891432581 -0.264723147619699]
[ 0.631613891432581 -0.264723147619699 0.36838610856741905
-0.          ] 9.256705160143564e-11
[ 4.8764534616556188e-01 -2.9626038548912392e-01
2.9317530542996811e-01

```

```

-7.9757482308604327e-02 2.5686639695707635e-06]
1.0350531417625187e-10
E_gs: -0.2962603854891239
test mps sampling took: (0.0012972354888916016, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.265088003021634
1 Execution time: 0:00:31.560186 ovlp:
(0.9985271964652715+0.045936910248584706j)
2 Execution time: 0:00:31.562186 ovlp:
(0.9937167849202837+0.08672180813233954j)
3 Execution time: 0:00:31.564796 ovlp:
(0.9856919656607175+0.1322779174670019j)
4 Execution time: 0:00:31.568037 ovlp:
(0.9756007414417796+0.1761596227830946j)
5 Execution time: 0:00:31.572084 ovlp:
(0.9613263071831373+0.21530371672892024j)
6 Execution time: 0:00:31.576648 ovlp:
(0.9446998672796816+0.25646381551315733j)
7 Execution time: 0:00:31.581844 ovlp:
(0.9255702213685313+0.29802151525163656j)
8 Execution time: 0:00:31.587800 ovlp:
(0.9029853671648811+0.33737840970818334j)
9 Execution time: 0:00:31.594301 ovlp:
(0.8789725095340228+0.37180729233750154j)
10 Execution time: 0:00:31.601484 ovlp:
(0.8524620459089103+0.4048025715261716j)
11 Execution time: 0:00:31.609245 ovlp:
(0.824478778749069+0.43782025076860176j)
12 Execution time: 0:00:31.617922 ovlp:
(0.7931803036327287+0.4680379232910159j)
13 Execution time: 0:00:31.628026 ovlp:
(0.7630130312312751+0.49211238106971456j)
14 Execution time: 0:00:31.639730 ovlp:
(0.7287577490185977+0.5189140453937089j)
x_points = [np.float64(0.0), np.float64(0.265088003021634),
np.float64(0.530176006043268), np.float64(0.7952640090649019),
np.float64(1.060352012086536), np.float64(1.32544001510817),
np.float64(1.5905280181298038), np.float64(1.8556160211514379),
np.float64(2.120704024173072), np.float64(2.385792027194706),
np.float64(2.65088003021634), np.float64(2.915968033237974),
np.float64(3.1810560362596076), np.float64(3.4461440392812417),
np.float64(3.7112320423028757)] y_points = [1.          +0.j
0.9985271964652715+0.04593691024858471j
0.9937167849202837+0.08672180813233954j
0.9856919656607175+0.1322779174670019j

```

```

0.9756007414417796+0.1761596227830946j
0.9613263071831373+0.21530371672892024j
0.9446998672796816+0.25646381551315733j
0.9255702213685313+0.29802151525163656j
0.9029853671648811+0.33737840970818334j
0.8789725095340228+0.37180729233750154j
0.8524620459089103+0.4048025715261716j
0.824478778749069 +0.43782025076860176j
0.7931803036327287+0.4680379232910159j
0.7630130312312751+0.49211238106971456j
0.7287577490185977+0.5189140453937089j ]
fit1: [ 0.6329327039816944 -0.26109662110147325]
[ 0.6329327039816944 -0.26109662110147325 0.36706729601830557
-0.          ] 9.50023044206152e-10
[ 5.1297123075980711e-01 -2.8732344165081697e-01
2.9843643406709053e-01
-6.4580527634462384e-02 3.4547284051799290e-06]
1.981046986435506e-10
E_gs: -0.28732344165081697
test mps sampling took: (0.0012867450714111328, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.18815721513307804
1 Execution time: 0:00:31.930686 ovlp:
(0.9991823991823992+0.03416703416703415j)
2 Execution time: 0:00:31.932715 ovlp:
(0.9968275968275968+0.0640654640654641j)
3 Execution time: 0:00:31.935353 ovlp:
(0.9929327929327929+0.09477029477029486j)
4 Execution time: 0:00:31.938746 ovlp:
(0.9873747873747873+0.12728112728112717j)
5 Execution time: 0:00:31.942562 ovlp:
(0.9799771799771799+0.15744555744555755j)
6 Execution time: 0:00:31.947081 ovlp:
(0.9718823718823719+0.18677838677838676j)
7 Execution time: 0:00:31.952282 ovlp:
(0.9617883617883618+0.2161560161560161j)
x_points = [np.float64(0.0), np.float64(0.18815721513307804),
np.float64(0.3763144302661561), np.float64(0.5644716453992341),
np.float64(0.7526288605323121), np.float64(0.9407860756653902),
np.float64(1.1289432907984682), np.float64(1.3171005059315464)] y_points
= [1.          +0.j
0.9991823991823992+0.03416703416703415j
0.9968275968275968+0.0640654640654641j
0.9929327929327929+0.09477029477029486j
0.9873747873747873+0.12728112728112717j

```

0.9799771799771799+0.15744555744555755j
 0.9718823718823719+0.18677838677838676j
 0.9617883617883618+0.2161560161560161j]
 fit1: [0.6043876237041644 -0.2786975845173482]
 [0.6043876237041644 -0.2786975845173482 0.39561237629583557
 -0.] 3.7346186703100866e-11
 [5.1607361255735607e-01 -2.7281967024231563e-01
 3.5035324206484569e-01
 -8.0047389730868682e-02 1.1395300871708449e-06]
 1.8108387380929988e-10
 E_gs: -0.2728196702423156
 test mps sampling took: (0.0012505054473876953, Counter({0: 6, 2: 4}))
 truncated ham size: 10 Number of fitting points: 15
 shots per matrix element: 357142.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.18867399965238738
 1 Execution time: 0:00:32.611664 ovlp:
 (0.999137597930235+0.03082247397393756j)
 2 Execution time: 0:00:32.613822 ovlp:
 (0.9966735920166208+0.0664049593719025j)
 3 Execution time: 0:00:32.616462 ovlp:
 (0.9931175834822004+0.0945730269752647j)
 4 Execution time: 0:00:32.620596 ovlp:
 (0.9872263693432863+0.12556350135240324j)
 5 Execution time: 0:00:32.624815 ovlp:
 (0.9799407518578045+0.15683957641498347j)
 6 Execution time: 0:00:32.629688 ovlp:
 (0.9709359302462326+0.1897228553348529j)
 7 Execution time: 0:00:32.635039 ovlp:
 (0.9617183081239395+0.21782372277693463j)
 8 Execution time: 0:00:32.640838 ovlp:
 (0.9496782792278702+0.24498938797453107j)
 9 Execution time: 0:00:32.647418 ovlp:
 (0.936630247912595+0.2756550615721478j)
 10 Execution time: 0:00:32.654591 ovlp:
 (0.9232182157237177+0.304175930022232j)
 11 Execution time: 0:00:32.663406 ovlp:
 (0.9064349754439411+0.33111199466878727j)
 12 Execution time: 0:00:32.673296 ovlp:
 (0.890458137099529+0.3550464521114851j)
 13 Execution time: 0:00:32.683547 ovlp:
 (0.8729748951397482+0.37823050775321865j)
 14 Execution time: 0:00:32.694429 ovlp:
 (0.8539572494973988+0.4027921667012j)
 x_points = [np.float64(0.0), np.float64(0.18867399965238738),
 np.float64(0.37734799930477475), np.float64(0.5660219989571621),
 np.float64(0.7546959986095495), np.float64(0.9433699982619369),

```

np.float64(1.1320439979143242), np.float64(1.3207179975667116),
np.float64(1.509391997219099), np.float64(1.6980659968714864),
np.float64(1.8867399965238738), np.float64(2.075413996176261),
np.float64(2.2640879958286484), np.float64(2.452761995481036),
np.float64(2.641435995133423)] y_points = [1.          +0.j
0.999137597930235 +0.03082247397393756j
0.9966735920166208+0.0664049593719025j
0.9931175834822004+0.0945730269752647j
0.9872263693432863+0.12556350135240324j
0.9799407518578045+0.15683957641498347j
0.9709359302462326+0.1897228553348529j
0.9617183081239395+0.21782372277693463j
0.9496782792278702+0.24498938797453107j
0.936630247912595 +0.2756550615721478j
0.9232182157237177+0.304175930022232j
0.9064349754439411+0.33111199466878727j
0.890458137099529 +0.3550464521114851j
0.8729748951397482+0.37823050775321865j
0.8539572494973988+0.4027921667012j ]
fit1: [ 0.6314564396532085 -0.26419338780155255]
[ 0.6314564396532085 -0.26419338780155255 0.3685435603467915
-0.          ] 3.365301682421598e-10
[ 4.8630657998584415e-01 -2.9607251479617269e-01
3.1757487503676474e-01
-7.4665970382261984e-02 9.8953804787322433e-07]
1.6528142397509066e-10
E_gs: -0.2960725147961727
test mps sampling took: (0.001322031021118164, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.18806152836327025
1 Execution time: 0:00:33.101367 ovlp:
(0.9991991980780754+0.0283136679528031j)
2 Execution time: 0:00:33.103331 ovlp:
(0.996858392460142+0.06441695460069097j)
3 Execution time: 0:00:33.105876 ovlp:
(0.9931343835225204+0.09682423237815763j)
4 Execution time: 0:00:33.109535 ovlp:
(0.9870975690341657+0.12496989992775975j)
5 Execution time: 0:00:33.113634 ovlp:
(0.9804167530002073+0.1576683784041082j)
6 Execution time: 0:00:33.118707 ovlp:
(0.9715743317783962+0.18707964899115748j)
7 Execution time: 0:00:33.124345 ovlp:
(0.9623791097098633+0.21374691299259108j)
8 Execution time: 0:00:33.130548 ovlp:

```

```

(0.9503894809347542+0.24505658813581155j)
9 Execution time: 0:00:33.137182 ovlp:
(0.9362606470255528+0.2713206511695627j)
10 Execution time: 0:00:33.144446 ovlp:
(0.9235878166107598+0.3037447289873496j)
11 Execution time: 0:00:33.152421 ovlp:
(0.9072525774061857+0.3296615911878189j)
12 Execution time: 0:00:33.162102 ovlp:
(0.8907605378252907+0.35519765247436585j)
13 Execution time: 0:00:33.173368 ovlp:
(0.8724092937823051+0.37934491042778506j)
14 Execution time: 0:00:33.183682 ovlp:
(0.8551444523466856+0.4028369668087204j)
x_points = [np.float64(0.0), np.float64(0.18806152836327025),
np.float64(0.3761230567265405), np.float64(0.5641845850898107),
np.float64(0.752246113453081), np.float64(0.9403076418163513),
np.float64(1.1283691701796215), np.float64(1.3164306985428917),
np.float64(1.504492226906162), np.float64(1.6925537552694323),
np.float64(1.8806152836327026), np.float64(2.0686768119959726),
np.float64(2.256738340359243), np.float64(2.444799868722513),
np.float64(2.6328613970857835)] y_points = [1.          +0.j
0.9991991980780754+0.0283136679528031j
0.996858392460142 +0.06441695460069097j
0.9931343835225204+0.09682423237815763j
0.9870975690341657+0.12496989992775975j
0.9804167530002073+0.1576683784041082j
0.9715743317783962+0.18707964899115748j
0.9623791097098633+0.21374691299259108j
0.9503894809347542+0.24505658813581155j
0.9362606470255528+0.2713206511695627j
0.9235878166107598+0.3037447289873496j
0.9072525774061857+0.3296615911878189j
0.8907605378252907+0.35519765247436585j
0.8724092937823051+0.37934491042778506j
0.8551444523466856+0.4028369668087204j ]
fit1: [ 0.631729369499414 -0.2642233009889571]
[ 0.631729369499414 -0.2642233009889571  0.36827063050058595
-0.          ] 1.8640697049514626e-10
[ 5.1822792141118079e-01 -2.8763548892047225e-01
2.9500351159982058e-01
-6.2705617333074448e-02 1.6510250740001955e-06]
1.6161354519230845e-10
E_gs: -0.28763548892047225
test mps sampling took: (0.0012848377227783203, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 172 2 qubit gates: 80

```

```

N gate: 172 dt: 0.23328680587506892
1 Execution time: 0:00:33.570539 ovlp:
(0.9987215971875139+0.041170690575519364j)
2 Execution time: 0:00:33.572515 ovlp:
(0.9948931887650152+0.07942757474066453j)
3 Execution time: 0:00:33.575068 ovlp:
(0.9890179758395468+0.11795645950421085j)
4 Execution time: 0:00:33.578408 ovlp:
(0.9811911586205491+0.15749174648184217j)
5 Execution time: 0:00:33.582253 ovlp:
(0.9704063348939367+0.19442942774474115j)
6 Execution time: 0:00:33.586721 ovlp:
(0.9572075058565128+0.22870830315826685j)
7 Execution time: 0:00:33.592515 ovlp:
(0.9420162724357994+0.2620623765372283j)
8 Execution time: 0:00:33.599728 ovlp:
(0.9244450337790744+0.3007816617196557j)
9 Execution time: 0:00:33.606871 ovlp:
(0.905772192698824+0.33252413155308935j)
10 Execution time: 0:00:33.614244 ovlp:
(0.8842161452755195+0.36515740334628743j)
11 Execution time: 0:00:33.622118 ovlp:
(0.8625104975230946+0.39431586749490855j)
12 Execution time: 0:00:33.630742 ovlp:
(0.8373028420662525+0.4221823288011233j)
13 Execution time: 0:00:33.640152 ovlp:
(0.8093683806104373+0.45174879384734656j)
14 Execution time: 0:00:33.650814 ovlp:
(0.78305232271511+0.4772080498577096j)
15 Execution time: 0:00:33.663050 ovlp:
(0.7532614571752059+0.4972340939150066j)
16 Execution time: 0:00:33.676200 ovlp:
(0.7241913932210651+0.5204901450783193j)
17 Execution time: 0:00:33.688276 ovlp:
(0.6925237235521917+0.5361233794714348j)
x_points = [np.float64(0.0), np.float64(0.23328680587506892),
np.float64(0.46657361175013784), np.float64(0.6998604176252068),
np.float64(0.9331472235002757), np.float64(1.1664340293753446),
np.float64(1.3997208352504136), np.float64(1.6330076411254824),
np.float64(1.8662944470005514), np.float64(2.09958125287562),
np.float64(2.332868058750689), np.float64(2.566154864625758),
np.float64(2.799441670500827), np.float64(3.032728476375896),
np.float64(3.2660152822509647), np.float64(3.4993020881260337),
np.float64(3.7325888940011027), np.float64(3.9658756998761717)] y_points
= [1.          +0.j
0.9987215971875139+0.04117069057551936j
0.9948931887650152+0.07942757474066453j

```

0.9890179758395468+0.11795645950421085j
 0.9811911586205491+0.15749174648184217j
 0.9704063348939367+0.19442942774474115j
 0.9572075058565128+0.22870830315826685j
 0.9420162724357994+0.2620623765372283j
 0.9244450337790744+0.3007816617196557j
 0.905772192698824 +0.33252413155308935j
 0.8842161452755195+0.36515740334628743j
 0.8625104975230946+0.39431586749490855j
 0.8373028420662525+0.4221823288011233j
 0.8093683806104373+0.45174879384734656j
 0.78305232271511 +0.4772080498577096j
 0.7532614571752059+0.4972340939150066j
 0.7241913932210651+0.5204901450783193j
 0.6925237235521917+0.5361233794714348j]
 fit1: [0.6269959610987633 -0.2629833095989047]
 [0.5675661331353862 -0.27662019853196085 0.3742358016090187
 -0.02386199400695585] 9.912276833093086e-10
 [0.44927720841197927 -0.30606469126090385 0.379021843334586
 -0.07371336108215479 -0.01262028224483584] 1.3619544497931762e-10
 E_gs: -0.30606469126090385
 test mps sampling took: (0.0013294219970703125, Counter({2: 7, 0: 3}))
 truncated ham size: 10 Number of fitting points: 21
 shots per matrix element: 250000.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.18489923056566815
 1 Execution time: 0:00:34.073896 ovlp:
 (0.99916+0.0335520000000000026j)
 2 Execution time: 0:00:34.075877 ovlp: (0.99684+0.061312000000000003j)
 3 Execution time: 0:00:34.078590 ovlp:
 (0.992696+0.0941680000000000003j)
 4 Execution time: 0:00:34.082309 ovlp:
 (0.987888000000000001+0.124271999999999994j)
 5 Execution time: 0:00:34.086361 ovlp:
 (0.9808239999999999+0.155928000000000007j)
 6 Execution time: 0:00:34.091187 ovlp: (0.973672000000000001+0.188056j)
 7 Execution time: 0:00:34.096629 ovlp:
 (0.9626079999999999+0.21331999999999995j)
 8 Execution time: 0:00:34.102692 ovlp:
 (0.9519839999999999+0.243416000000000008j)
 9 Execution time: 0:00:34.110105 ovlp: (0.939168+0.2698879999999999j)
 10 Execution time: 0:00:34.118283 ovlp:
 (0.925720000000000001+0.29789599999999994j)
 11 Execution time: 0:00:34.127481 ovlp:
 (0.911704000000000001+0.32367199999999996j)
 12 Execution time: 0:00:34.137279 ovlp:
 (0.894504+0.3505039999999999j)


```

13 Execution time: 0:00:34.146873  ovlp:
(0.8775679999999999+0.3720319999999999j)
14 Execution time: 0:00:34.156758  ovlp:
(0.8606400000000001+0.39768800000000004j)
15 Execution time: 0:00:34.167343  ovlp:
(0.8409599999999999+0.4215439999999999j)
16 Execution time: 0:00:34.180276  ovlp:
(0.821536+0.44399999999999995j)
17 Execution time: 0:00:34.193675  ovlp:
(0.7969120000000001+0.46295200000000003j)
18 Execution time: 0:00:34.207270  ovlp:
(0.7743439999999999+0.47896800000000006j)
19 Execution time: 0:00:34.223247  ovlp:
(0.7519359999999999+0.500264j)
20 Execution time: 0:00:34.239065  ovlp:
(0.7305759999999999+0.5164880000000001j)
x_points = [np.float64(0.0), np.float64(0.18489923056566815),
np.float64(0.3697984611313363), np.float64(0.5546976916970044),
np.float64(0.7395969222626726), np.float64(0.9244961528283407),
np.float64(1.109395383394009), np.float64(1.2942946139596772),
np.float64(1.4791938445253452), np.float64(1.6640930750910132),
np.float64(1.8489923056566815), np.float64(2.0338915362223497),
np.float64(2.218790766788018), np.float64(2.403689997353686),
np.float64(2.5885892279193543), np.float64(2.7734884584850223),
np.float64(2.9583876890506904), np.float64(3.1432869196163584),
np.float64(3.3281861501820265), np.float64(3.513085380747695),
np.float64(3.697984611313363)] y_points = [1.          +0.j
0.99916          +0.033552000000000003j
0.99684          +0.061312000000000003j
0.992696         +0.094168000000000003j
0.9878880000000001+0.124271999999999994j
0.9808239999999999+0.155928000000000007j
0.9736720000000001+0.188056j
0.9626079999999999+0.21331999999999995j
0.9519839999999999+0.243416000000000008j
0.939168         +0.26988799999999999j
0.9257200000000001+0.297895999999999994j
0.9117040000000001+0.32367199999999996j
0.894504         +0.35050399999999999j
0.8775679999999999+0.37203199999999999j
0.8606400000000001+0.39768800000000004j
0.8409599999999999+0.4215439999999999j
0.821536         +0.44399999999999995j
0.7969120000000001+0.46295200000000003j
0.7743439999999999+0.47896800000000006j
0.7519359999999999+0.500264j
0.7305759999999999+0.5164880000000001j ]

```

```

fit1: [ 0.6318099482360128 -0.261941392137267 ]
[ 6.317088792175169e-01 -2.618682812657335e-01
3.681900517639872e-01
-2.215209029707677e-04] 3.261932373034114e-09
[ 3.930603081203789e-01 -3.228716276430821e-01
5.061823612493248e-01
-8.198600494348313e-02 -7.600851628482747e-05]
3.3084758463344127e-10
E_gs: -0.3228716276430821
test mps sampling took: (0.0012745857238769531, Counter({0: 9, 2: 1}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1985994974937665
1 Execution time: 0:00:34.637134 ovlp:
(0.999136+0.0340928000000000034j)
2 Execution time: 0:00:34.639095 ovlp:
(0.9964223999999999+0.067430399999999989j)
3 Execution time: 0:00:34.642287 ovlp:
(0.9919168+0.101747199999999993j)
4 Execution time: 0:00:34.645951 ovlp:
(0.9859903999999999+0.131820800000000007j)
5 Execution time: 0:00:34.650000 ovlp:
(0.9780864+0.165939199999999995j)
6 Execution time: 0:00:34.654908 ovlp:
(0.96883840000000001+0.19955839999999999j)
7 Execution time: 0:00:34.660238 ovlp:
(0.9573119999999999+0.226188800000000008j)
8 Execution time: 0:00:34.666101 ovlp:
(0.9442687999999999+0.25889279999999999j)
9 Execution time: 0:00:34.672558 ovlp:
(0.9305344+0.29153279999999999j)
10 Execution time: 0:00:34.679656 ovlp:
(0.9142079999999999+0.31636479999999999j)
11 Execution time: 0:00:34.688308 ovlp:
(0.89686400000000001+0.34328319999999999j)
12 Execution time: 0:00:34.698555 ovlp:
(0.8781504+0.37316480000000001j)
13 Execution time: 0:00:34.708823 ovlp: (0.8600128+0.400064j)
14 Execution time: 0:00:34.718929 ovlp: (0.8416896+0.4235072j)
15 Execution time: 0:00:34.731380 ovlp:
(0.8168447999999999+0.44416000000000001j)
16 Execution time: 0:00:34.744225 ovlp: (0.7927104+0.468032j)
x_points = [np.float64(0.0), np.float64(0.1985994974937665),
np.float64(0.397198994987533), np.float64(0.5957984924812996),
np.float64(0.794397989975066), np.float64(0.9929974874688325),
np.float64(1.1915969849625991), np.float64(1.3901964824563655),

```

```

np.float64(1.588795979950132), np.float64(1.7873954774438987),
np.float64(1.985994974937665), np.float64(2.1845944724314315),
np.float64(2.3831939699251983), np.float64(2.5817934674189646),
np.float64(2.780392964912731), np.float64(2.978992462406498),
np.float64(3.177591959900264)] y_points = [1.          +0.j
0.999136          +0.034092800000000003j
0.9964223999999999+0.067430399999999989j
0.9919168          +0.101747199999999993j
0.9859903999999999+0.131820800000000007j
0.9780864          +0.165939199999999995j
0.9688384000000001+0.19955839999999999j
0.9573119999999999+0.226188800000000008j
0.9442687999999999+0.25889279999999999j
0.9305344          +0.29153279999999999j
0.9142079999999999+0.31636479999999999j
0.8968640000000001+0.34328319999999999j
0.8781504          +0.37316480000000001j
0.8600128          +0.400064j
0.8416896          +0.4235072j
0.8168447999999999+0.44416000000000001j
0.7927104          +0.468032j          ]
fit1: [ 0.6362439196400228 -0.26213452574363305]
[ 0.6362439196400228 -0.26213452574363305 0.3637560803599772
-0.          ] 5.989811369144504e-10
[ 4.9761107642168123e-01 -2.9189070946373791e-01
2.9054336233635214e-01
-7.7534007258473189e-02 -3.7781598856140241e-06]
2.686911783049682e-10
E_gs: -0.2918907094637379
test mps sampling took: (0.0013010501861572266, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.22827520500906495
1 Execution time: 0:00:35.155848 ovlp:
(0.9988911968953513+0.03897730913646558j)
2 Execution time: 0:00:35.157814 ovlp:
(0.9951759864927623+0.0745598087674646j)
3 Execution time: 0:00:35.160417 ovlp:
(0.9890919694575144+0.11634872577643218j)
4 Execution time: 0:00:35.163585 ovlp:
(0.9814023479265741+0.15073602206086179j)
5 Execution time: 0:00:35.167406 ovlp:
(0.9712431194807345+0.1874489248569895j)
6 Execution time: 0:00:35.171968 ovlp:
(0.9590102852287987+0.2259690327132915j)
7 Execution time: 0:00:35.177414 ovlp:

```

```

(0.9438470427717198+0.2610619309734068j)
8 Execution time: 0:00:35.183354  ovlp:
(0.9280069984195956+0.29453482469750925j)
9 Execution time: 0:00:35.190653  ovlp:
(0.908667744269684+0.32697811553872347j)
10 Execution time: 0:00:35.199037  ovlp:
(0.8896236909463346+0.3565917984570357j)
11 Execution time: 0:00:35.207253  ovlp:
(0.867210028188079+0.3878182858912005j)
12 Execution time: 0:00:35.216665  ovlp:
(0.8428811600672481+0.41411275951572657j)
13 Execution time: 0:00:35.227361  ovlp:
(0.817465088902249+0.4426680394705105j)
14 Execution time: 0:00:35.238753  ovlp:
(0.7924018187250925+0.46890491293375614j)
15 Execution time: 0:00:35.250932  ovlp:
(0.7640769394154303+0.49162817655889435j)
16 Execution time: 0:00:35.264267  ovlp:
(0.7326632514571041+0.5129258361923414j)
17 Execution time: 0:00:35.276683  ovlp:
(0.7057783761794534+0.5290970814718281j)
18 Execution time: 0:00:35.289175  ovlp:
(0.6729966843907162+0.5469099313478079j)
x_points = [np.float64(0.0), np.float64(0.22827520500906495),
np.float64(0.4565504100181299), np.float64(0.6848256150271949),
np.float64(0.9131008200362598), np.float64(1.1413760250453246),
np.float64(1.3696512300543897), np.float64(1.5979264350634548),
np.float64(1.8262016400725196), np.float64(2.0544768450815845),
np.float64(2.2827520500906493), np.float64(2.5110272550997146),
np.float64(2.7393024601087794), np.float64(2.9675776651178443),
np.float64(3.1958528701269096), np.float64(3.4241280751359744),
np.float64(3.6524032801450392), np.float64(3.880678485154104),
np.float64(4.108953690163169)] y_points = [1.          +0.j
0.9988911968953513+0.03897730913646558j
0.9951759864927623+0.0745598087674646j
0.9890919694575144+0.11634872577643218j
0.9814023479265741+0.15073602206086179j
0.9712431194807345+0.1874489248569895j
0.9590102852287987+0.2259690327132915j
0.9438470427717198+0.2610619309734068j
0.9280069984195956+0.29453482469750925j
0.908667744269684 +0.32697811553872347j
0.8896236909463346+0.3565917984570357j
0.867210028188079 +0.3878182858912005j
0.8428811600672481+0.41411275951572657j
0.817465088902249 +0.4426680394705105j
0.7924018187250925+0.46890491293375614j

```

0.7640769394154303+0.49162817655889435j
0.7326632514571041+0.5129258361923414j
0.7057783761794534+0.5290970814718281j
0.6729966843907162+0.5469099313478079j]
fit1: [0.6261206405901681 -0.26275903574138965]
[0.5191558196709944 -0.28776448673459115 0.38295708731903455
-0.04420263651208589] 5.758517052534869e-10
[0.4812666966190588 -0.2976037524291128 0.3327644389448385
-0.06103343384489459 -0.01829043962737344] 2.437803566960598e-10
E_gs: -0.2976037524291128
test mps sampling took: (0.0021321773529052734, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.15323777912123124
1 Execution time: 0:00:35.753009 ovlp:
(0.9995319986895963+0.030114084319436074j)
2 Execution time: 0:00:35.755749 ovlp:
(0.9977463936899023+0.05165654463832503j)
3 Execution time: 0:00:35.758491 ovlp:
(0.9953271869161233+0.07536621102539076j)
4 Execution time: 0:00:35.761780 ovlp:
(0.9915615763724139+0.10559189565730787j)
5 Execution time: 0:00:35.766439 ovlp:
(0.9871407639941392+0.12964716301205637j)
6 Execution time: 0:00:35.771829 ovlp:
(0.9813447477652937+0.15198162554855155j)
7 Execution time: 0:00:35.780438 ovlp:
(0.974375128250359+0.17503609010105237j)
8 Execution time: 0:00:35.793147 ovlp:
(0.9665127062355774+0.20092016257645517j)
9 Execution time: 0:00:35.802933 ovlp:
(0.9578798820636698+0.2266746346889772j)
10 Execution time: 0:00:35.816735 ovlp:
(0.9486638562587975+0.25244350684181915j)
11 Execution time: 0:00:35.826151 ovlp:
(0.9383462273694367+0.2728555639955792j)
12 Execution time: 0:00:35.837948 ovlp:
(0.926394193903743+0.29637082983832364j)
13 Execution time: 0:00:35.850316 ovlp:
(0.9139453590470052+0.31601968485511756j)
14 Execution time: 0:00:35.862018 ovlp:
(0.9003517209848189+0.34147895614107715j)
15 Execution time: 0:00:35.874733 ovlp:
(0.8876004852813588+0.360717410008748j)
16 Execution time: 0:00:35.898482 ovlp:
(0.8738484467756509+0.38263427137595984j)

```
17 Execution time: 0:00:35.919041 ovlp:
(0.8576844015163243+0.40016632046569733j)
18 Execution time: 0:00:35.932942 ovlp:
(0.8391299495638587+0.41831037126903947j)
x_points = [np.float64(0.0), np.float64(0.15323777912123124),
np.float64(0.3064755582424625), np.float64(0.4597133373636937),
np.float64(0.612951116484925), np.float64(0.7661888956061562),
np.float64(0.9194266747273874), np.float64(1.0726644538486187),
np.float64(1.22590223296985), np.float64(1.379140012091081),
np.float64(1.5323777912123124), np.float64(1.6856155703335436),
np.float64(1.8388533494547747), np.float64(1.9920911285760061),
np.float64(2.1453289076972375), np.float64(2.2985666868184684),
np.float64(2.4518044659397), np.float64(2.605042245060931),
np.float64(2.758280024182162)] y_points = [1.          +0.j
0.9995319986895963+0.03011408431943607j
0.9977463936899023+0.05165654463832503j
0.9953271869161233+0.07536621102539076j
0.9915615763724139+0.10559189565730787j
0.9871407639941392+0.12964716301205637j
0.9813447477652937+0.15198162554855155j
0.974375128250359 +0.17503609010105237j
0.9665127062355774+0.20092016257645517j
0.9578798820636698+0.2266746346889772j
0.9486638562587975+0.25244350684181915j
0.9383462273694367+0.2728555639955792j
0.926394193903743 +0.29637082983832364j
0.9139453590470052+0.31601968485511756j
0.9003517209848189+0.34147895614107715j
0.8876004852813588+0.360717410008748j
0.8738484467756509+0.38263427137595984j
0.8576844015163243+0.40016632046569733j
0.8391299495638587+0.41831037126903947j]
fit1: [ 0.6326061146278905 -0.26431299049785145]
[ 0.6326061146278905 -0.26431299049785145 0.3673938853721095
-0.          ] 4.558948247978042e-10
[ 5.0140696210791980e-01 -2.9274952554522710e-01
3.2683463633730186e-01
-6.5096568358822507e-02 5.1965472155316879e-07]
3.3312183606849855e-10
E_gs: -0.2927495255452271
test mps sampling took: (0.0013270378112792969, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.03138912241637446
1 Execution time: 0:00:36.298282 ovlp:
(0.9999943999865599+0.006087214609315161j)
```

```

2 Execution time: 0:00:36.300289 ovlp:
(0.9999159997983995+0.010948026275263034j)
3 Execution time: 0:00:36.302866 ovlp:
(0.9997927995027187+0.017696042470501938j)
4 Execution time: 0:00:36.306352 ovlp:
(0.9996359991263979+0.022030452873086803j)
5 Execution time: 0:00:36.310310 ovlp:
(0.9993279983871961+0.02677926427023425j)
6 Execution time: 0:00:36.314921 ovlp:
(0.999115197876475+0.03126487503570008j)
7 Execution time: 0:00:36.320819 ovlp:
(0.9988855973254336+0.037156089174614104j)
8 Execution time: 0:00:36.327058 ovlp:
(0.9985663965593516+0.041288899093357756j)
9 Execution time: 0:00:36.333582 ovlp:
(0.9983255959814303+0.04846251631003917j)
10 Execution time: 0:00:36.340607 ovlp:
(0.997759994623987+0.05244412586590208j)
11 Execution time: 0:00:36.348534 ovlp:
(0.9973287935891046+0.05702493685984855j)
12 Execution time: 0:00:36.357309 ovlp:
(0.9965671917612602+0.06412015388836934j)
13 Execution time: 0:00:36.367599 ovlp:
(0.9962423909817384+0.0675025620061489j)
14 Execution time: 0:00:36.378938 ovlp:
(0.9955143892345342+0.07250337400809759j)
x_points = [np.float64(0.0), np.float64(0.03138912241637446),
np.float64(0.06277824483274892), np.float64(0.09416736724912339),
np.float64(0.12555648966549784), np.float64(0.1569456120818723),
np.float64(0.18833473449824678), np.float64(0.21972385691462124),
np.float64(0.2511129793309957), np.float64(0.28250210174737017),
np.float64(0.3138912241637446), np.float64(0.3452803465801191),
np.float64(0.37666946899649356), np.float64(0.408058591412868),
np.float64(0.43944771382924247)] y_points = [1.          +0.j
0.9999943999865599+0.00608721460931516j
0.9999159997983995+0.01094802627526303j
0.9997927995027187+0.01769604247050194j
0.9996359991263979+0.0220304528730868j
0.9993279983871961+0.02677926427023425j
0.999115197876475 +0.03126487503570008j
0.9988855973254336+0.0371560891746141j
0.9985663965593516+0.04128889909335776j
0.9983255959814303+0.04846251631003917j
0.997759994623987 +0.05244412586590208j
0.9973287935891046+0.05702493685984855j
0.9965671917612602+0.06412015388836934j
0.9962423909817384+0.0675025620061489j

```

0.9955143892345342+0.07250337400809759j]
fit1: [0.5855938077514314 -0.2928210181265672]
[0.5855938077514314 -0.2928210181265672 0.41440619224856856
-0.] 5.982759692612687e-11
[5.2427072521820073e-01 -2.5104821690300982e-01
3.7890896010724645e-01
-1.0377619548400280e-01 6.6560402134188357e-07]
5.432367482628907e-11
E_gs: -0.2510482169030098
test mps sampling took: (0.0013000965118408203, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2526032735726545
1 Execution time: 0:00:36.996805 ovlp:
(0.9986751978803166+0.04139046622474596j)
2 Execution time: 0:00:36.998857 ovlp:
(0.9943455909529455+0.08617453787926066j)
3 Execution time: 0:00:37.001478 ovlp:
(0.9870111792178868+0.12628340205344335j)
4 Execution time: 0:00:37.004796 ovlp:
(0.9775263640421825+0.16880187008299208j)
5 Execution time: 0:00:37.008616 ovlp:
(0.9656799450879121+0.2104083366533387j)
6 Execution time: 0:00:37.013132 ovlp:
(0.9481887171019474+0.2508628013804821j)
7 Execution time: 0:00:37.018555 ovlp:
(0.9320606912971061+0.28840846145353827j)
8 Execution time: 0:00:37.024472 ovlp:
(0.9117374587799341+0.32493651989843175j)
9 Execution time: 0:00:37.031345 ovlp:
(0.8903870246192394+0.3598613757782012j)
10 Execution time: 0:00:37.038629 ovlp:
(0.8638141821026915+0.3918486269578032j)
11 Execution time: 0:00:37.046580 ovlp:
(0.8388541421666276+0.4206198729917967j)
12 Execution time: 0:00:37.055212 ovlp:
(0.810495696793115+0.45076392122227404j)
13 Execution time: 0:00:37.065326 ovlp:
(0.7793244469191152+0.47606956171129866j)
14 Execution time: 0:00:37.075470 ovlp:
(0.7511196017913628+0.4986007977612765j)
15 Execution time: 0:00:37.085994 ovlp:
(0.7163099460959137+0.5262776420442272j)
16 Execution time: 0:00:37.097128 ovlp:
(0.6846490954385527+0.5440184704295528j)
17 Execution time: 0:00:37.110211 ovlp:

(0.6493690389904623+0.5592536948059117j)
18 Execution time: 0:00:37.125165 ovlp:
(0.6110841777346845+0.574604119366591j)
19 Execution time: 0:00:37.138821 ovlp:
(0.5797977276763642+0.5889561423298277j)
20 Execution time: 0:00:37.153686 ovlp:
(0.5446616714586743+0.596050553680886j)
21 Execution time: 0:00:37.171369 ovlp:
(0.5123864198182717+0.6024729639567423j)
22 Execution time: 0:00:37.187511 ovlp:
(0.4774423639077823+0.6073689717903548j)
23 Execution time: 0:00:37.203357 ovlp:
(0.4396663034660855+0.6089241742786788j)
24 Execution time: 0:00:37.219607 ovlp:
(0.40594144950631916+0.6060825697321115j)
x_points = [np.float64(0.0), np.float64(0.2526032735726545),
np.float64(0.505206547145309), np.float64(0.7578098207179635),
np.float64(1.010413094290618), np.float64(1.2630163678632724),
np.float64(1.515619641435927), np.float64(1.7682229150085815),
np.float64(2.020826188581236), np.float64(2.2734294621538904),
np.float64(2.526032735726545), np.float64(2.7786360092991993),
np.float64(3.031239282871854), np.float64(3.2838425564445086),
np.float64(3.536445830017163), np.float64(3.7890491035898175),
np.float64(4.041652377162472), np.float64(4.294255650735127),
np.float64(4.546858924307781), np.float64(4.799462197880436),
np.float64(5.05206547145309), np.float64(5.304668745025745),
np.float64(5.557272018598399), np.float64(5.8098752921710535),
np.float64(6.062478565743708)] y_points = [1. +0.j
0.9986751978803166 +0.04139046622474596j
0.9943455909529455 +0.08617453787926066j
0.9870111792178868 +0.12628340205344335j
0.9775263640421825 +0.16880187008299208j
0.9656799450879121 +0.2104083366533387j
0.9481887171019474 +0.2508628013804821j
0.9320606912971061 +0.28840846145353827j
0.9117374587799341 +0.32493651989843175j
0.8903870246192394 +0.3598613757782012j
0.8638141821026915 +0.3918486269578032j
0.8388541421666276 +0.4206198729917967j
0.810495696793115 +0.45076392122227404j
0.7793244469191152 +0.47606956171129866j
0.7511196017913628 +0.4986007977612765j
0.7163099460959137 +0.5262776420442272j
0.6846490954385527 +0.5440184704295528j
0.6493690389904623 +0.5592536948059117j
0.6110841777346845 +0.574604119366591j
0.5797977276763642 +0.5889561423298277j

```

0.5446616714586743 +0.596050553680886j
0.5123864198182717 +0.6024729639567423j
0.4774423639077823 +0.6073689717903548j
0.4396663034660855 +0.6089241742786788j
0.40594144950631916+0.6060825697321115j ]
fit1: [ 0.6187699570308933 -0.25833724463868063]
[ 0.40867246795702195 -0.3131600764650207 0.43652189281675263
-0.08818057046597136] 9.158181069414401e-09
[ 0.3917691073296716 -0.32336642655267306 0.34057120199253754
-0.08690259485697001 -0.04510903398844587] 1.129532235280377e-09
E_gs: -0.32336642655267306
test mps sampling took: (0.0012788772583007812, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2176568129077708
1 Execution time: 0:00:37.812070 ovlp:
(0.999009999009999+0.037837837837837895j)
2 Execution time: 0:00:37.814066 ovlp:
(0.9956923956923958+0.06998866998867004j)
3 Execution time: 0:00:37.816766 ovlp:
(0.9903155903155902+0.1087879087879089j)
4 Execution time: 0:00:37.820141 ovlp:
(0.9832843832843834+0.14146674146674143j)
5 Execution time: 0:00:37.823969 ovlp:
(0.9738375738375737+0.18196878196878208j)
6 Execution time: 0:00:37.828427 ovlp:
(0.9626791626791626+0.2152944152944154j)
7 Execution time: 0:00:37.833580 ovlp:
(0.9502755502755502+0.24791164791164788j)
8 Execution time: 0:00:37.841320 ovlp:
(0.9340747340747342+0.2803264803264802j)
9 Execution time: 0:00:37.848337 ovlp:
(0.9180895180895181+0.31415371415371407j)
10 Execution time: 0:00:37.856312 ovlp:
(0.8998470998470998+0.34482614482614493j)
11 Execution time: 0:00:37.865041 ovlp:
(0.876984676984677+0.3722337722337723j)
x_points = [np.float64(0.0), np.float64(0.2176568129077708),
np.float64(0.4353136258155416), np.float64(0.6529704387233124),
np.float64(0.8706272516310832), np.float64(1.088284064538854),
np.float64(1.3059408774466248), np.float64(1.5235976903543957),
np.float64(1.7412545032621665), np.float64(1.9589113161699372),
np.float64(2.176568129077708), np.float64(2.394224941985479)] y_points =
[1. +0.j
0.999009999009999 +0.0378378378378379j
0.9956923956923958+0.06998866998867004j

```

0.9903155903155902+0.1087879087879089j
0.9832843832843834+0.14146674146674143j
0.9738375738375737+0.18196878196878208j
0.9626791626791626+0.2152944152944154j
0.9502755502755502+0.24791164791164788j
0.9340747340747342+0.2803264803264802j
0.9180895180895181+0.31415371415371407j
0.8998470998470998+0.34482614482614493j
0.876984676984677 +0.3722337722337723j]
fit1: [0.6307866976074076 -0.2649764740793611]
[0.6307866976074076 -0.2649764740793611 0.3692133023925924
-0.] 9.654274508638225e-11
[5.3113117816095756e-01 -2.8549640151850852e-01
2.6943176058994872e-01
-5.8934603157164034e-02 2.6314634604814240e-06]
9.837478348049776e-11
E_gs: -0.2854964015185085
test mps sampling took: (0.0012767314910888672, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2105275232559863
1 Execution time: 0:00:38.268984 ovlp:
(0.9990319999999999+0.03699999999999992j)
2 Execution time: 0:00:38.270955 ovlp:
(0.9961679999999999+0.071064000000000002j)
3 Execution time: 0:00:38.273479 ovlp:
(0.99122400000000001+0.10519999999999996j)
4 Execution time: 0:00:38.276658 ovlp:
(0.9845919999999999+0.14089599999999999j)
5 Execution time: 0:00:38.280618 ovlp: (0.975768+0.177432000000000003j)
6 Execution time: 0:00:38.285192 ovlp: (0.96492+0.205632000000000004j)
7 Execution time: 0:00:38.290406 ovlp: (0.95228+0.24190399999999999j)
8 Execution time: 0:00:38.297357 ovlp: (0.938768+0.275336j)
9 Execution time: 0:00:38.304824 ovlp:
(0.921616+0.301544000000000003j)
10 Execution time: 0:00:38.312506 ovlp:
(0.905296000000000001+0.337032j)
11 Execution time: 0:00:38.320413 ovlp:
(0.8868799999999999+0.36538399999999993j)
12 Execution time: 0:00:38.329181 ovlp:
(0.865288000000000001+0.389448j)
13 Execution time: 0:00:38.338596 ovlp: (0.843648+0.41296j)
14 Execution time: 0:00:38.348707 ovlp: (0.819448+0.439368j)
15 Execution time: 0:00:38.360883 ovlp: (0.7984+0.463848000000000004j)
16 Execution time: 0:00:38.374556 ovlp:
(0.7705759999999999+0.48527999999999993j)

```

17 Execution time: 0:00:38.387740  ovlp:
(0.74565600000000001+0.50228800000000001j)
18 Execution time: 0:00:38.401987  ovlp: (0.716672+0.52207200000000001j)
19 Execution time: 0:00:38.417927  ovlp:
(0.6895199999999999+0.54160000000000001j)
20 Execution time: 0:00:38.433109  ovlp: (0.663184+0.555016j)
x_points = [np.float64(0.0), np.float64(0.2105275232559863),
np.float64(0.4210550465119726), np.float64(0.6315825697679589),
np.float64(0.8421100930239452), np.float64(1.0526376162799316),
np.float64(1.2631651395359178), np.float64(1.4736926627919043),
np.float64(1.6842201860478905), np.float64(1.8947477093038767),
np.float64(2.105275232559863), np.float64(2.3158027558158496),
np.float64(2.5263302790718356), np.float64(2.736857802327822),
np.float64(2.9473853255838085), np.float64(3.1579128488397945),
np.float64(3.368440372095781), np.float64(3.5789678953517674),
np.float64(3.7894954186077534), np.float64(4.00002294186374),
np.float64(4.210550465119726)] y_points = [1.          +0.j
0.9990319999999999+0.03699999999999992j
0.9961679999999999+0.07106400000000002j
0.99122400000000001+0.10519999999999996j
0.9845919999999999+0.14089599999999999j
0.975768          +0.17743200000000003j
0.96492          +0.20563200000000004j
0.95228          +0.24190399999999999j
0.938768          +0.275336j
0.921616          +0.30154400000000003j
0.90529600000000001+0.337032j
0.8868799999999999+0.36538399999999993j
0.86528800000000001+0.389448j
0.843648          +0.41296j
0.819448          +0.439368j
0.7984           +0.46384800000000004j
0.7705759999999999+0.48527999999999993j
0.74565600000000001+0.50228800000000001j
0.716672          +0.52207200000000001j
0.6895199999999999+0.54160000000000001j
0.663184          +0.555016j          ]
fit1: [ 0.6305225395278097 -0.2607802316476492]
[ 0.4340450117954067 -0.3079837233349898  0.41175953437865465
-0.08164582093399733] 8.768826025094935e-10
[ 0.3852538282354912 -0.3277114125882717  0.3810032592439328
-0.07822438807386366 -0.05350561779738572] 2.9213110779006957e-10
E_gs: -0.3277114125882717
test mps sampling took: (0.0013053417205810547, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 172 2 qubit gates: 80

```

```

N gate: 172 dt: 0.1697734434120136
1 Execution time: 0:00:38.977141 ovlp: (0.99932+0.026275999999999966j)
2 Execution time: 0:00:38.979149 ovlp: (0.997412+0.057860000000000002j)
3 Execution time: 0:00:38.981737 ovlp:
(0.9943139999999999+0.084732000000000003j)
4 Execution time: 0:00:38.985080 ovlp:
(0.9896339999999999+0.113544000000000009j)
5 Execution time: 0:00:38.988950 ovlp:
(0.9841979999999999+0.141102000000000006j)
x_points = [np.float64(0.0), np.float64(0.1697734434120136),
np.float64(0.3395468868240272), np.float64(0.5093203302360408),
np.float64(0.6790937736480545), np.float64(0.8488672170600681)]
y_points = [1.          +0.j
0.99932          +0.02627599999999997j
0.997412          +0.057860000000000002j
0.9943139999999999+0.084732000000000003j
0.9896339999999999+0.113544000000000009j
0.9841979999999999+0.141102000000000006j]
fit1: [ 0.5823723137311365 -0.2914396248318564]
[ 0.5823723137311365 -0.2914396248318564  0.4176276862688635
-0.          ] 4.330016796910061e-11
[ 5.2269318327732428e-01 -2.5114924912758269e-01
3.8243318129201953e-01
-9.7081058807755943e-02  6.6248829403221627e-07]
5.6255331892807824e-11
E_gs: -0.2511492491275827
test mps sampling took: (0.0013170242309570312, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.24102392065171493
1 Execution time: 0:00:39.447129 ovlp:
(0.9987391999999999+0.040441600000000008j)
2 Execution time: 0:00:39.449150 ovlp:
(0.994848+0.083411200000000002j)
3 Execution time: 0:00:39.451799 ovlp:
(0.9883264+0.119385599999999998j)
4 Execution time: 0:00:39.455196 ovlp:
(0.9798271999999999+0.15989119999999999j)
5 Execution time: 0:00:39.459189 ovlp:
(0.9676735999999999+0.2027584j)
6 Execution time: 0:00:39.463738 ovlp:
(0.95474560000000001+0.23732479999999999j)
7 Execution time: 0:00:39.469163 ovlp:
(0.9381888+0.26993280000000001j)
8 Execution time: 0:00:39.475050 ovlp:
(0.9199615999999999+0.30525439999999999j)

```

```

9 Execution time: 0:00:39.482128 ovlp:
(0.8989567999999999+0.34376319999999994j)
10 Execution time: 0:00:39.489451 ovlp:
(0.8761344+0.37694720000000004j)
11 Execution time: 0:00:39.498436 ovlp:
(0.8541567999999999+0.40466559999999996j)
12 Execution time: 0:00:39.508346 ovlp: (0.8265984+0.4359872j)
13 Execution time: 0:00:39.518999 ovlp:
(0.7999552000000001+0.4608128j)
14 Execution time: 0:00:39.529923 ovlp: (0.7704256+0.4859392j)
15 Execution time: 0:00:39.541889 ovlp:
(0.7407552+0.5086592000000001j)
16 Execution time: 0:00:39.554562 ovlp:
(0.7089856000000001+0.5332479999999999j)
x_points = [np.float64(0.0), np.float64(0.24102392065171493),
np.float64(0.48204784130342987), np.float64(0.7230717619551448),
np.float64(0.9640956826068597), np.float64(1.2051196032585747),
np.float64(1.4461435239102896), np.float64(1.6871674445620046),
np.float64(1.9281913652137195), np.float64(2.1692152858654343),
np.float64(2.4102392065171494), np.float64(2.6512631271688645),
np.float64(2.892287047820579), np.float64(3.133310968472294),
np.float64(3.3743348891240093), np.float64(3.615358809775724),
np.float64(3.856382730427439)] y_points = [1.          +0.j
0.9987391999999999+0.04044160000000008j
0.994848          +0.08341120000000002j
0.9883264          +0.11938559999999998j
0.9798271999999999+0.15989119999999999j
0.9676735999999999+0.2027584j
0.9547456000000001+0.23732479999999999j
0.9381888          +0.26993280000000001j
0.9199615999999999+0.30525439999999999j
0.8989567999999999+0.34376319999999994j
0.8761344          +0.37694720000000004j
0.8541567999999999+0.40466559999999996j
0.8265984          +0.4359872j
0.7999552000000001+0.4608128j
0.7704256          +0.4859392j
0.7407552          +0.5086592000000001j
0.7089856000000001+0.5332479999999999j ]
fit1: [ 0.6338858932630549 -0.2610040201505736]
[ 0.6262221173815598 -0.26260973720290554 0.3661322802266847
-0.00308541926979671] 2.1221207697692067e-09
[ 0.4495591460788252 -0.30430723097366336 0.3957066941938707
-0.07715764337595303 -0.00181034186380648] 3.981573237425886e-10
E_gs: -0.30430723097366336
test mps sampling took: (0.0012722015380859375, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 11

```

```

shots per matrix element: 500000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.12479078501763208
1 Execution time: 0:00:39.896741 ovlp:
(0.9996640000000001+0.020383999999999958j)
2 Execution time: 0:00:39.898748 ovlp:
(0.9987520000000001+0.04260799999999998j)
3 Execution time: 0:00:39.901356 ovlp:
(0.9969159999999999+0.06557199999999996j)
4 Execution time: 0:00:39.904639 ovlp:
(0.9944200000000001+0.08399200000000007j)
5 Execution time: 0:00:39.908628 ovlp: (0.99106+0.10315199999999991j)
6 Execution time: 0:00:39.913385 ovlp:
(0.9872479999999999+0.12362399999999996j)
7 Execution time: 0:00:39.918657 ovlp: (0.983296+0.1446639999999999j)
8 Execution time: 0:00:39.924671 ovlp: (0.97828+0.16720000000000002j)
9 Execution time: 0:00:39.931257 ovlp: (0.971992+0.18545600000000007j)
10 Execution time: 0:00:39.938392 ovlp:
(0.9661120000000001+0.20656000000000008j)
x_points = [np.float64(0.0), np.float64(0.12479078501763208),
np.float64(0.24958157003526416), np.float64(0.37437235505289623),
np.float64(0.4991631400705283), np.float64(0.6239539250881604),
np.float64(0.7487447101057925), np.float64(0.8735354951234245),
np.float64(0.9983262801410566), np.float64(1.1231170651586888),
np.float64(1.2479078501763208)] y_points = [1.          +0.j
0.9996640000000001+0.02038399999999996j
0.9987520000000001+0.04260799999999998j
0.9969159999999999+0.06557199999999996j
0.9944200000000001+0.08399200000000007j
0.99106          +0.10315199999999991j
0.9872479999999999+0.12362399999999996j
0.983296          +0.1446639999999999j
0.97828          +0.16720000000000002j
0.971992          +0.18545600000000007j
0.9661120000000001+0.20656000000000008j]
fit1: [ 0.6219820774175364 -0.27113324861362126]
[ 0.6219820774175364 -0.27113324861362126 0.3780179225824636
-0.          ] 3.564725370762874e-11
[ 5.0831154435788339e-01 -2.8488507278243241e-01
2.9143886741382502e-01
-8.1300274231280362e-02 2.7132734334590406e-06]
3.565964654974165e-11
E_gs: -0.2848850727824324
test mps sampling took: (0.0013058185577392578, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 172 2 qubit gates: 80

```

N gate: 172 dt: 0.05137061472002343
 1 Execution time: 0:00:40.394518 ovlp:
 (0.9999383999384+0.00926660926660916j)
 2 Execution time: 0:00:40.396524 ovlp:
 (0.9997703997703997+0.01638701638701634j)
 3 Execution time: 0:00:40.399157 ovlp:
 (0.9994903994903994+0.027108227108227023j)
 4 Execution time: 0:00:40.402466 ovlp:
 (0.999098399098399+0.03567903567903574j)
 5 Execution time: 0:00:40.406329 ovlp:
 (0.9985831985831986+0.04493304493304495j)
 6 Execution time: 0:00:40.410817 ovlp:
 (0.9978103978103978+0.05121345121345122j)
 7 Execution time: 0:00:40.416683 ovlp:
 (0.9970907970907972+0.05953505953505944j)
 x_points = [np.float64(0.0), np.float64(0.05137061472002343),
 np.float64(0.10274122944004686), np.float64(0.1541118441600703),
 np.float64(0.20548245888009373), np.float64(0.25685307360011717),
 np.float64(0.3082236883201406), np.float64(0.35959430304016404)]
 y_points = [1. +0.j
 0.9999383999384 +0.00926660926660916j
 0.9997703997703997+0.01638701638701634j
 0.9994903994903994+0.02710822710822702j
 0.999098399098399 +0.03567903567903574j
 0.9985831985831986+0.04493304493304495j
 0.9978103978103978+0.05121345121345122j
 0.9970907970907972+0.05953505953505944j]
 fit1: [0.585905549896943 -0.29301069283210435]
 [0.585905549896943 -0.29301069283210435 0.414094450103057
 -0.] 1.5284756496827388e-11
 [5.3281448885636362e-01 -2.5561405528052022e-01
 3.8425902891700392e-01
 -1.0469633592494196e-01 5.3448161270630533e-07]
 1.6335058175506561e-10
 E_gs: -0.2556140552805202
 test mps sampling took: (0.0012807846069335938, Counter({2: 6, 0: 4}))
 truncated ham size: 10 Number of fitting points: 15
 shots per matrix element: 357142.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.1700744603483399
 1 Execution time: 0:00:40.929915 ovlp:
 (0.9993167983603162+0.030923274215858054j)
 2 Execution time: 0:00:40.931960 ovlp:
 (0.9973287935891046+0.05213052511326022j)
 3 Execution time: 0:00:40.934645 ovlp:
 (0.994433586640608+0.0879482110757066j)
 4 Execution time: 0:00:40.938235 ovlp:


```

(0.9892535742085782+0.11550587721410532j)
5 Execution time: 0:00:40.942270  ovlp:
(0.9840623617496682+0.14594755027412076j)
6 Execution time: 0:00:40.947209  ovlp:
(0.9772751454603492+0.16995480789153894j)
7 Execution time: 0:00:40.952990  ovlp:
(0.9690095256228615+0.19593327023984863j)
8 Execution time: 0:00:40.959159  ovlp:
(0.9591927020624849+0.22342373621696687j)
9 Execution time: 0:00:40.966061  ovlp:
(0.9486814768355445+0.24879179710031307j)
10 Execution time: 0:00:40.973329  ovlp:
(0.9373918497404394+0.27397505754013807j)
11 Execution time: 0:00:40.981484  ovlp:
(0.9249542198901277+0.2995783189879655j)
12 Execution time: 0:00:40.990170  ovlp:
(0.9126397903354968+0.3241791780300274j)
13 Execution time: 0:00:41.000601  ovlp:
(0.8938125451501084+0.34940723857737255j)
14 Execution time: 0:00:41.011796  ovlp:
(0.8803501128402709+0.3716168918805405j)
x_points = [np.float64(0.0), np.float64(0.1700744603483399),
np.float64(0.3401489206966798), np.float64(0.5102233810450196),
np.float64(0.6802978413933596), np.float64(0.8503723017416995),
np.float64(1.0204467620900393), np.float64(1.1905212224383792),
np.float64(1.3605956827867192), np.float64(1.5306701431350591),
np.float64(1.700744603483399), np.float64(1.8708190638317388),
np.float64(2.0408935241800785), np.float64(2.2109679845284185),
np.float64(2.3810424448767584)] y_points = [1.          +0.j
0.9993167983603162+0.03092327421585805j
0.9973287935891046+0.05213052511326022j
0.994433586640608 +0.0879482110757066j
0.9892535742085782+0.11550587721410532j
0.9840623617496682+0.14594755027412076j
0.9772751454603492+0.16995480789153894j
0.9690095256228615+0.19593327023984863j
0.9591927020624849+0.22342373621696687j
0.9486814768355445+0.24879179710031307j
0.9373918497404394+0.27397505754013807j
0.9249542198901277+0.2995783189879655j
0.9126397903354968+0.3241791780300274j
0.8938125451501084+0.34940723857737255j
0.8803501128402709+0.3716168918805405j ]
fit1: [ 0.6391197217452256 -0.262260552634651 ]
[ 0.6391197217452256 -0.262260552634651  0.3608802782547744
-0.          ] 5.99727018527504e-10
[ 5.1774527073423460e-01 -2.8780352441395168e-01

```

```

2.9409780455216000e-01
-6.4731546327804396e-02 1.7371301317393035e-06]
5.500490591574324e-10
E_gs: -0.2878035244139517
test mps sampling took: (0.0012650489807128906, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.29399453266962683
1 Execution time: 0:00:41.452329 ovlp:
(0.9979783951481485+0.048490516377239334j)
2 Execution time: 0:00:41.454376 ovlp:
(0.9924511818828365+0.1001058402540167j)
3 Execution time: 0:00:41.457020 ovlp:
(0.9824999579998992+0.1452643486344367j)
4 Execution time: 0:00:41.460465 ovlp:
(0.9697655274372659+0.19563646952752678j)
5 Execution time: 0:00:41.464578 ovlp:
(0.9523998857597258+0.23961337507210012j)
6 Execution time: 0:00:41.469261 ovlp:
(0.9330854394050545+0.2851078842589223j)
7 Execution time: 0:00:41.474565 ovlp:
(0.9097557834138803+0.32452637886330926j)
8 Execution time: 0:00:41.480521 ovlp:
(0.8832565198156475+0.37006008814421154j)
9 Execution time: 0:00:41.487181 ovlp:
(0.8553516528439669+0.4036489687575251j)
10 Execution time: 0:00:41.494437 ovlp:
(0.8210011704028091+0.4407042576902185j)
11 Execution time: 0:00:41.502363 ovlp:
(0.7882634918323803+0.47077072984975166j)
12 Execution time: 0:00:41.510910 ovlp:
(0.7524290058296139+0.49939239854175654j)
13 Execution time: 0:00:41.520131 ovlp:
(0.7124169098005835+0.5263396632151918j)
14 Execution time: 0:00:41.530343 ovlp:
(0.6739896175750821+0.5488741172978815j)
x_points = [np.float64(0.0), np.float64(0.29399453266962683),
np.float64(0.5879890653392537), np.float64(0.8819835980088805),
np.float64(1.1759781306785073), np.float64(1.469972663348134),
np.float64(1.763967196017761), np.float64(2.057961728687388),
np.float64(2.3519562613570146), np.float64(2.6459507940266414),
np.float64(2.939945326696268), np.float64(3.2339398593658952),
np.float64(3.527934392035522), np.float64(3.8219289247051487),
np.float64(4.115923457374776)] y_points = [1.          +0.j
0.9979783951481485+0.04849051637723933j
0.9924511818828365+0.1001058402540167j

```

```

0.9824999579998992+0.1452643486344367j
0.9697655274372659+0.19563646952752678j
0.9523998857597258+0.23961337507210012j
0.9330854394050545+0.2851078842589223j
0.9097557834138803+0.32452637886330926j
0.8832565198156475+0.37006008814421154j
0.8553516528439669+0.4036489687575251j
0.8210011704028091+0.4407042576902185j
0.7882634918323803+0.47077072984975166j
0.7524290058296139+0.49939239854175654j
0.7124169098005835+0.5263396632151918j
0.6739896175750821+0.5488741172978815j ]
fit1: [ 0.6299181128497343 -0.2612730341822128]
[ 0.5581678813883647 -0.2776452069792186 0.37238352920282164
-0.02931857939024161] 1.0219358098980502e-09
[ 0.4742062576269098 -0.2982203126809711 0.3513950730610588
-0.06694892031943314 -0.01222334748675294] 2.3717993851039055e-10
E_gs: -0.2982203126809711
test mps sampling took: (0.0013275146484375, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.03335444854179366
1 Execution time: 0:00:41.910422 ovlp:
(0.9999711999884799+0.004426801770720745j)
2 Execution time: 0:00:41.912417 ovlp:
(0.9998895999558399+0.011559604623841757j)
3 Execution time: 0:00:41.915070 ovlp:
(0.9997767999107199+0.016818006727202794j)
4 Execution time: 0:00:41.918479 ovlp:
(0.9996879998752+0.022995609198243727j)
5 Execution time: 0:00:41.922369 ovlp:
(0.9993687997475198+0.028134011253604596j)
6 Execution time: 0:00:41.926914 ovlp:
(0.9990111996044799+0.03232441292976507j)
x_points = [np.float64(0.0), np.float64(0.03335444854179366),
np.float64(0.06670889708358732), np.float64(0.10006334562538098),
np.float64(0.13341779416717464), np.float64(0.1667722427089683),
np.float64(0.20012669125076196)] y_points = [1. +0.j
0.9999711999884799+0.00442680177072075j
0.9998895999558399+0.01155960462384176j
0.9997767999107199+0.01681800672720279j
0.9996879998752 +0.02299560919824373j
0.9993687997475198+0.0281340112536046j
0.9990111996044799+0.03232441292976507j]
fit1: [ 0.2638523244063621 -0.6596982628252003]
[ 0.2638523244063621 -0.6596982628252003 0.2638623243063621

```

```

-0.          ] 3.1613700670576153e-11
[ 2.2524950826110068e-01 -5.6323045029031504e-01
2.2525431220758332e-01
-2.3251507094591267e-01 1.4628652660323931e-06]
8.944000976048838e-11
E_gs: -0.563230450290315
test mps sampling took: (0.0012974739074707031, Counter({2: 8, 0: 2}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1676734983059289
1 Execution time: 0:00:42.299849 ovlp:
(0.9993223993223994+0.02750662750662758j)
2 Execution time: 0:00:42.301837 ovlp:
(0.9976459976459977+0.05485705485705483j)
3 Execution time: 0:00:42.304602 ovlp:
(0.9945527945527946+0.08574508574508566j)
4 Execution time: 0:00:42.308223 ovlp:
(0.9902715902715902+0.11501831501831505j)
5 Execution time: 0:00:42.312283 ovlp:
(0.9842215842215842+0.1406351406351407j)
6 Execution time: 0:00:42.317182 ovlp:
(0.9780659780659782+0.16546876546876543j)
7 Execution time: 0:00:42.322613 ovlp:
(0.9698203698203698+0.19203159203159204j)
8 Execution time: 0:00:42.328841 ovlp:
(0.9605231605231606+0.22243562243562254j)
9 Execution time: 0:00:42.335514 ovlp:
(0.95005995005995+0.24726484726484732j)
10 Execution time: 0:00:42.342672 ovlp:
(0.9386463386463386+0.2721600721600721j)
11 Execution time: 0:00:42.351498 ovlp:
(0.9264143264143263+0.29460449460449456j)
x_points = [np.float64(0.0), np.float64(0.1676734983059289),
np.float64(0.3353469966118578), np.float64(0.5030204949177867),
np.float64(0.6706939932237156), np.float64(0.8383674915296445),
np.float64(1.0060409898355733), np.float64(1.1737144881415023),
np.float64(1.3413879864474312), np.float64(1.50906148475336),
np.float64(1.676734983059289), np.float64(1.844408481365218)] y_points =
[1.          +0.j
0.9993223993223994+0.02750662750662758j
0.9976459976459977+0.05485705485705483j
0.9945527945527946+0.08574508574508566j
0.9902715902715902+0.11501831501831505j
0.9842215842215842+0.1406351406351407j
0.9780659780659782+0.16546876546876543j
0.9698203698203698+0.19203159203159204j

```

0.9605231605231606+0.22243562243562254j
0.95005995005995 +0.24726484726484732j
0.9386463386463386+0.2721600721600721j
0.9264143264143263+0.29460449460449456j]
fit1: [0.6260929643439955 -0.26802210413200706]
[0.6260929643439955 -0.26802210413200706 0.37390703565600447
-0.] 1.0347594921379147e-10
[5.2132240448213074e-01 -2.8427729141860392e-01
3.1901551646919618e-01
-6.2090419200902087e-02 1.6533096859117183e-06]
1.2019436407769215e-10
E_gs: -0.2842772914186039
test mps sampling took: (0.0013041496276855469, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2239498079226964
1 Execution time: 0:00:42.856100 ovlp:
(0.998966397726075+0.03982428761343271j)
2 Execution time: 0:00:42.858076 ovlp:
(0.9953079896775774+0.07733317013297425j)
3 Execution time: 0:00:42.860666 ovlp:
(0.9904119789063537+0.10951764093881011j)
4 Execution time: 0:00:42.864065 ovlp:
(0.9819459602811127+0.15329613725150204j)
5 Execution time: 0:00:42.867944 ovlp:
(0.9727727401000281+0.1850590071298157j)
6 Execution time: 0:00:42.873678 ovlp:
(0.9603899128578084+0.2207794857148686j)
7 Execution time: 0:00:42.880197 ovlp:
(0.9459262810378182+0.2551127612480748j)
8 Execution time: 0:00:42.887185 ovlp:
(0.930585447287984+0.2860256292563843j)
9 Execution time: 0:00:42.894283 ovlp:
(0.9140206108453439+0.3244525137955303j)
10 Execution time: 0:00:42.902119 ovlp:
(0.892151762733878+0.3544541797991956j)
11 Execution time: 0:00:42.911532 ovlp:
(0.8715341173750581+0.382660641853412j)
12 Execution time: 0:00:42.921179 ovlp:
(0.8484412665707866+0.4095615010353022j)
13 Execution time: 0:00:42.931559 ovlp:
(0.8247568144649917+0.4355035581078279j)
14 Execution time: 0:00:42.942593 ovlp:
(0.7974955544902198+0.46093561405835093j)
15 Execution time: 0:00:42.954737 ovlp:
(0.7721382987042571+0.48810847383864253j)

```

16 Execution time: 0:00:42.968469  ovlp:
(0.7432314351091573+0.5072369159212151j)
17 Execution time: 0:00:42.981444  ovlp:
(0.7121553667418068+0.5261069574353063j)
x_points = [np.float64(0.0), np.float64(0.2239498079226964),
np.float64(0.4478996158453928), np.float64(0.6718494237680892),
np.float64(0.8957992316907856), np.float64(1.119749039613482),
np.float64(1.3436988475361784), np.float64(1.5676486554588747),
np.float64(1.7915984633815711), np.float64(2.0155482713042674),
np.float64(2.239498079226964), np.float64(2.4634478871496603),
np.float64(2.687397695072357), np.float64(2.9113475029950533),
np.float64(3.1352973109177493), np.float64(3.359247118840446),
np.float64(3.5831969267631423), np.float64(3.8071467346858388)]
y_points = [1.          +0.j
0.998966397726075 +0.03982428761343271j
0.9953079896775774+0.07733317013297425j
0.9904119789063537+0.10951764093881011j
0.9819459602811127+0.15329613725150204j
0.9727727401000281+0.1850590071298157j
0.9603899128578084+0.2207794857148686j
0.9459262810378182+0.2551127612480748j
0.930585447287984 +0.2860256292563843j
0.9140206108453439+0.3244525137955303j
0.892151762733878 +0.3544541797991956j
0.8715341173750581+0.382660641853412j
0.8484412665707866+0.4095615010353022j
0.8247568144649917+0.4355035581078279j
0.7974955544902198+0.46093561405835093j
0.7721382987042571+0.48810847383864253j
0.7432314351091573+0.5072369159212151j
0.7121553667418068+0.5261069574353063j ]
fit1: [ 0.6309831056189334 -0.2627728467129815]
[ 0.6309831056189334 -0.2627728467129815  0.36901689438106655
-0.          ] 2.269823165058744e-09
[ 4.8948532268530182e-01 -2.9326844926696616e-01
2.9940478348453475e-01
-7.9743394975544821e-02  5.5086472380899648e-06]
6.010474532838013e-10
E_gs: -0.29326844926696616
test mps sampling took: (0.0012500286102294922, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.01862320203524979
1 Execution time: 0:00:43.328681  ovlp:
(0.9999663999663999+0.0012138012138012133j)
2 Execution time: 0:00:43.330677  ovlp:

```

(0.9999747999747999+0.00868980868980862j)
3 Execution time: 0:00:43.333309 ovlp:
(0.9999495999496+0.007774207774207786j)
4 Execution time: 0:00:43.337032 ovlp:
(0.9998151998151998+0.011965811965811923j)
5 Execution time: 0:00:43.341083 ovlp:
(0.9998235998235998+0.017047817047816993j)
6 Execution time: 0:00:43.345702 ovlp:
(0.9996135996135995+0.02000462000462j)
7 Execution time: 0:00:43.351005 ovlp:
(0.9996051996051996+0.02146622146622157j)
8 Execution time: 0:00:43.356830 ovlp:
(0.9995127995127995+0.021499821499821437j)
9 Execution time: 0:00:43.363293 ovlp:
(0.9993027993027992+0.029505029505029423j)
10 Execution time: 0:00:43.370409 ovlp:
(0.9991599991599991+0.032159432159432066j)
11 Execution time: 0:00:43.378726 ovlp:
(0.998966798966799+0.0372246372246372j)
12 Execution time: 0:00:43.387615 ovlp:
(0.9988323988323988+0.03880383880383875j)
13 Execution time: 0:00:43.397016 ovlp:
(0.9985803985803985+0.03915663915663914j)
14 Execution time: 0:00:43.406859 ovlp:
(0.9985635985635986+0.04323904323904326j)
15 Execution time: 0:00:43.419761 ovlp:
(0.9981519981519982+0.04489384489384496j)
16 Execution time: 0:00:43.433022 ovlp:
(0.9978411978411978+0.04848064848064859j)
17 Execution time: 0:00:43.445287 ovlp:
(0.9978915978915979+0.05427665427665418j)
18 Execution time: 0:00:43.460937 ovlp:
(0.9975471975471975+0.06142506142506132j)
19 Execution time: 0:00:43.474723 ovlp:
(0.9974043974043973+0.05788025788025797j)
20 Execution time: 0:00:43.488755 ovlp:
(0.9970095970095969+0.06152586152586159j)
21 Execution time: 0:00:43.506360 ovlp:
(0.9965055965055964+0.0679266679266679j)
x_points = [np.float64(0.0), np.float64(0.01862320203524979),
np.float64(0.03724640407049958), np.float64(0.05586960610574937),
np.float64(0.07449280814099916), np.float64(0.09311601017624896),
np.float64(0.11173921221149874), np.float64(0.13036241424674855),
np.float64(0.14898561628199833), np.float64(0.1676088183172481),
np.float64(0.18623202035249792), np.float64(0.2048552223877477),
np.float64(0.22347842442299748), np.float64(0.2421016264582473),
np.float64(0.2607248284934971), np.float64(0.27934803052874685),

```

np.float64(0.29797123256399666), np.float64(0.31659443459924647),
np.float64(0.3352176366344962), np.float64(0.353840838669746),
np.float64(0.37246404070499584), np.float64(0.3910872427402456)]
y_points = [1.          +0.j
0.9999663999663999+0.00121380121380121j
0.9999747999747999+0.00868980868980862j
0.9999495999496   +0.00777420777420779j
0.9998151998151998+0.01196581196581192j
0.9998235998235998+0.01704781704781699j
0.9996135996135995+0.02000462000462j
0.9996051996051996+0.02146622146622157j
0.9995127995127995+0.02149982149982144j
0.9993027993027992+0.02950502950502942j
0.9991599991599991+0.03215943215943207j
0.998966798966799 +0.0372246372246372j
0.9988323988323988+0.03880383880383875j
0.9985803985803985+0.03915663915663914j
0.9985635985635986+0.04323904323904326j
0.9981519981519982+0.04489384489384496j
0.9978411978411978+0.04848064848064859j
0.9978915978915979+0.05427665427665418j
0.9975471975471975+0.06142506142506132j
0.9974043974043973+0.05788025788025797j
0.9970095970095969+0.06152586152586159j
0.9965055965055964+0.0679266679266679j ]
fit1: [ 0.5840446026644466 -0.29202225625172695]
[ 0.5840446026644466 -0.29202225625172695 0.4159553973355534
-0.          ] 4.164185007052206e-10
[ 5.1214799473434824e-01 -2.6262376660299913e-01
3.7236994621803032e-01
-9.7863431145964269e-02 1.2083777507344366e-06]
4.150286104372506e-10
E_gs: -0.26262376660299913
test mps sampling took: (0.0012731552124023438, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.289223728421627
1 Execution time: 0:00:44.038780 ovlp:
(0.9979264000000001+0.04813439999999991j)
2 Execution time: 0:00:44.040962 ovlp:
(0.9928128+0.09880960000000005j)
3 Execution time: 0:00:44.043703 ovlp:
(0.983552+0.14059519999999992j)
4 Execution time: 0:00:44.047250 ovlp: (0.9705792+0.191616j)
5 Execution time: 0:00:44.051338 ovlp:
(0.9540671999999999+0.23630719999999994j)

```



```

6 Execution time: 0:00:44.055897 ovlp: (0.933216+0.2765888000000001j)
7 Execution time: 0:00:44.061661 ovlp: (0.911872+0.32241279999999994j)
8 Execution time: 0:00:44.067827 ovlp:
(0.8870207999999999+0.36073599999999995j)
9 Execution time: 0:00:44.075226 ovlp:
(0.8573568+0.3996671999999999j)
10 Execution time: 0:00:44.083536 ovlp:
(0.8267648000000001+0.4363391999999999j)
11 Execution time: 0:00:44.091780 ovlp:
(0.7949184+0.46768640000000006j)
12 Execution time: 0:00:44.101320 ovlp:
(0.7553728+0.49752320000000005j)
13 Execution time: 0:00:44.112523 ovlp: (0.7212224+0.5215424j)
14 Execution time: 0:00:44.124105 ovlp:
(0.6810240000000001+0.5455232000000001j)
15 Execution time: 0:00:44.136691 ovlp:
(0.6453504000000001+0.5638399999999999j)
16 Execution time: 0:00:44.150784 ovlp: (0.6010624+0.5803136j)
x_points = [np.float64(0.0), np.float64(0.289223728421627),
np.float64(0.578447456843254), np.float64(0.8676711852648811),
np.float64(1.156894913686508), np.float64(1.4461186421081351),
np.float64(1.7353423705297621), np.float64(2.0245660989513894),
np.float64(2.313789827373016), np.float64(2.603013555794643),
np.float64(2.8922372842162702), np.float64(3.1814610126378975),
np.float64(3.4706847410595243), np.float64(3.759908469481151),
np.float64(4.049132197902779), np.float64(4.338355926324406),
np.float64(4.627579654746032)] y_points = [1.          +0.j
0.9979264000000001+0.04813439999999999j
0.9928128      +0.09880960000000005j
0.983552      +0.14059519999999992j
0.9705792      +0.191616j
0.9540671999999999+0.23630719999999994j
0.933216      +0.2765888000000001j
0.911872      +0.32241279999999994j
0.8870207999999999+0.36073599999999995j
0.8573568      +0.3996671999999999j
0.8267648000000001+0.4363391999999999j
0.7949184      +0.46768640000000006j
0.7553728      +0.49752320000000005j
0.7212224      +0.5215424j
0.6810240000000001+0.5455232000000001j
0.6453504000000001+0.5638399999999999j
0.6010624      +0.5803136j      ]
fit1: [ 0.6276078506342011 -0.26086132493265585]
[ 0.5371642458164666 -0.28200366896147455 0.3764206835713049
-0.03782091815733894] 1.5531399481259248e-09
[ 0.514594580037541 -0.2877185038476804 0.3232315788029318

```

```

-0.04934146802856041 -0.01330040904865359] 9.79052765477914e-10
E_gs: -0.2877185038476804
test mps sampling took: (0.0013003349304199219, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.24753482918610484
1 Execution time: 0:00:44.578707 ovlp:
(0.9986687999999999+0.0426127999999999895j)
2 Execution time: 0:00:44.580707 ovlp:
(0.994664+0.081841599999999996j)
3 Execution time: 0:00:44.583328 ovlp:
(0.9878864+0.124108799999999991j)
4 Execution time: 0:00:44.586589 ovlp:
(0.97804160000000001+0.166255999999999996j)
x_points = [np.float64(0.0), np.float64(0.24753482918610484),
np.float64(0.4950696583722097), np.float64(0.7426044875583145),
np.float64(0.9901393167444194)] y_points = [1.          +0.j
0.9986687999999999+0.04261279999999999j
0.994664          +0.081841599999999996j
0.9878864         +0.124108799999999991j
0.97804160000000001+0.166255999999999996j]
fit1: [ 0.5829187850019973 -0.29312447141241055]
[ 0.5829187850019973 -0.29312447141241055 0.41708121499800266
-0.          ] 5.833524526701388e-11
[ 4.9812142093437528e-01 -2.7582882628394034e-01
3.1115615035863453e-01
-9.9370993461425264e-02 2.7680835578589246e-06]
1.8725079562538172e-11
E_gs: -0.27582882628394034
test mps sampling took: (0.0012705326080322266, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.24914302902739
1 Execution time: 0:00:45.172662 ovlp:
(0.9986679962703895+0.043376521454260075j)
2 Execution time: 0:00:45.174780 ovlp:
(0.993995183186513+0.07995262386734692j)
3 Execution time: 0:00:45.177391 ovlp:
(0.987637565385183+0.12409594746865293j)
4 Execution time: 0:00:45.180631 ovlp:
(0.9779247381892668+0.16664806661458642j)
5 Execution time: 0:00:45.184492 ovlp:
(0.9657567041187716+0.20742178078098616j)
6 Execution time: 0:00:45.189060 ovlp:
(0.9517454648873016+0.2479578942821039j)

```

```

7 Execution time: 0:00:45.194334  ovlp:
(0.9336086141041195+0.2826763914938961j)
8 Execution time: 0:00:45.200151  ovlp:
(0.9136861583212432+0.3159404846333569j)
9 Execution time: 0:00:45.208191  ovlp:
(0.8914308960065087+0.35707419980775956j)
10 Execution time: 0:00:45.216911  ovlp:
(0.8692908340143353+0.3836494742185279j)
11 Execution time: 0:00:45.225085  ovlp:
(0.8410451549264337+0.41511356231797447j)
12 Execution time: 0:00:45.233983  ovlp:
(0.8134906777738977+0.44777285376399045j)
13 Execution time: 0:00:45.243428  ovlp:
(0.7882690071532201+0.47254092311458473j)
14 Execution time: 0:00:45.255014  ovlp:
(0.7562073173804886+0.4982017949650259j)
15 Execution time: 0:00:45.268020  ovlp:
(0.7232600251280703+0.5193986543162321j)
16 Execution time: 0:00:45.279933  ovlp:
(0.6926599394478306+0.5393643102200687j)
17 Execution time: 0:00:45.295010  ovlp:
(0.6568758392523499+0.5585235638659789j)
18 Execution time: 0:00:45.309069  ovlp:
(0.6222581423227984+0.5708139982791951j)
x_points = [np.float64(0.0), np.float64(0.24914302902739),
np.float64(0.49828605805478), np.float64(0.74742908708217),
np.float64(0.99657211610956), np.float64(1.24571514513695),
np.float64(1.49485817416434), np.float64(1.74400120319173),
np.float64(1.99314423221912), np.float64(2.24228726124651),
np.float64(2.4914302902739), np.float64(2.74057331930129),
np.float64(2.98971634832868), np.float64(3.23885937735607),
np.float64(3.48800240638346), np.float64(3.73714543541085),
np.float64(3.98628846443824), np.float64(4.23543149346563),
np.float64(4.48457452249302)] y_points = [1.          +0.j
0.9986679962703895+0.04337652145426008j
0.993995183186513 +0.07995262386734692j
0.987637565385183 +0.12409594746865293j
0.9779247381892668+0.16664806661458642j
0.9657567041187716+0.20742178078098616j
0.9517454648873016+0.2479578942821039j
0.9336086141041195+0.2826763914938961j
0.9136861583212432+0.3159404846333569j
0.8914308960065087+0.35707419980775956j
0.8692908340143353+0.3836494742185279j
0.8410451549264337+0.41511356231797447j
0.8134906777738977+0.44777285376399045j
0.7882690071532201+0.47254092311458473j

```

```

0.7562073173804886+0.4982017949650259j
0.7232600251280703+0.5193986543162321j
0.6926599394478306+0.5393643102200687j
0.6568758392523499+0.5585235638659789j
0.6222581423227984+0.5708139982791951j ]
fit1: [ 0.6272418088432336 -0.2617887492075059]
[ 0.5007033225572342 -0.291860764295166  0.3873432010194326
-0.0531564983920526] 2.739254463810831e-09
[ 0.4814582919371696 -0.29757996089402833  0.32847013081747956
-0.05961159768910847 -0.02302654766425155] 1.697480521525657e-09
E_gs: -0.29757996089402833
test mps sampling took: (0.0013494491577148438, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.15907483152768845
1 Execution time: 0:00:45.752192 ovlp:
(0.9993615993615994+0.02469462469462469j)
2 Execution time: 0:00:45.754247 ovlp:
(0.9978551978551979+0.05488425488425497j)
3 Execution time: 0:00:45.756919 ovlp:
(0.9949655949655949+0.07957467957467967j)
4 Execution time: 0:00:45.760348 ovlp:
(0.9912527912527913+0.1064323064323065j)
5 Execution time: 0:00:45.764307 ovlp:
(0.9860251860251861+0.13192633192633196j)
6 Execution time: 0:00:45.769020 ovlp:
(0.9795515795515795+0.16055636055636047j)
7 Execution time: 0:00:45.775039 ovlp:
(0.9722883722883724+0.18393358393358383j)
x_points = [np.float64(0.0), np.float64(0.15907483152768845),
np.float64(0.3181496630553769), np.float64(0.4772244945830654),
np.float64(0.6362993261107538), np.float64(0.7953741576384422),
np.float64(0.9544489891661307), np.float64(1.1135238206938192)] y_points
= [1.          +0.j
0.9993615993615994+0.02469462469462469j
0.9978551978551979+0.05488425488425497j
0.9949655949655949+0.07957467957467967j
0.9912527912527913+0.1064323064323065j
0.9860251860251861+0.13192633192633196j
0.9795515795515795+0.16055636055636047j
0.9722883722883724+0.18393358393358383j]
fit1: [ 0.5841753332567954 -0.2878092017388894]
[ 0.5841753332567954 -0.2878092017388894  0.4158246667432046
-0.          ] 4.3544019282787796e-11
[ 4.8346260359141363e-01 -2.9274198056142287e-01
3.3261990244734774e-01

```

-8.1706233638473222e-02 3.1320448366860025e-06]
1.7495167548539323e-11
E_gs: -0.29274198056142287
test mps sampling took: (0.001255035400390625, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.13896869785832083
1 Execution time: 0:00:46.374717 ovlp:
(0.9996399989919971+0.024865269622754926j)
2 Execution time: 0:00:46.376698 ovlp:
(0.9982575951212664+0.04817893490101777j)
3 Execution time: 0:00:46.379260 ovlp:
(0.9962055893756503+0.06659658647044209j)
4 Execution time: 0:00:46.382493 ovlp:
(0.9928215799004236+0.09117025527671485j)
5 Execution time: 0:00:46.386316 ovlp:
(0.9896679710703189+0.11467832109929899j)
6 Execution time: 0:00:46.391013 ovlp:
(0.9847071571800401+0.13979919143773611j)
7 Execution time: 0:00:46.396500 ovlp:
(0.9792567419188773+0.15994484784557406j)
8 Execution time: 0:00:46.403311 ovlp:
(0.9725967232708252+0.18263211136991186j)
9 Execution time: 0:00:46.410279 ovlp:
(0.9654759033325293+0.20686017920850186j)
10 Execution time: 0:00:46.418562 ovlp:
(0.9580598825676712+0.22795623827746714j)
11 Execution time: 0:00:46.427773 ovlp:
(0.9493118580732025+0.2503051008542825j)
12 Execution time: 0:00:46.438596 ovlp:
(0.9394910305748856+0.2707459580886826j)
13 Execution time: 0:00:46.448624 ovlp:
(0.9299006037216904+0.29143161600852485j)
14 Execution time: 0:00:46.459949 ovlp:
(0.9173437685625521+0.3107348700576362j)
15 Execution time: 0:00:46.471099 ovlp:
(0.9066013384837477+0.32891492096177877j)
16 Execution time: 0:00:46.485511 ovlp:
(0.8949661059050966+0.34894537704705564j)
17 Execution time: 0:00:46.498701 ovlp:
(0.8815596683670714+0.36927103395889516j)
18 Execution time: 0:00:46.511265 ovlp:
(0.8682540311112872+0.38849508778624586j)
x_points = [np.float64(0.0), np.float64(0.13896869785832083),
np.float64(0.27793739571664167), np.float64(0.4169060935749625),
np.float64(0.5558747914332833), np.float64(0.6948434892916042),

```

np.float64(0.833812187149925), np.float64(0.9727808850082458),
np.float64(1.1117495828665667), np.float64(1.2507182807248876),
np.float64(1.3896869785832084), np.float64(1.528655676441529),
np.float64(1.66762437429985), np.float64(1.8065930721581709),
np.float64(1.9455617700164916), np.float64(2.0845304678748127),
np.float64(2.2234991657331333), np.float64(2.362467863591454),
np.float64(2.501436561449775)] y_points = [1.          +0.j
0.9996399989919971+0.02486526962275493j
0.9982575951212664+0.04817893490101777j
0.9962055893756503+0.06659658647044209j
0.9928215799004236+0.09117025527671485j
0.9896679710703189+0.11467832109929899j
0.9847071571800401+0.13979919143773611j
0.9792567419188773+0.15994484784557406j
0.9725967232708252+0.18263211136991186j
0.9654759033325293+0.20686017920850186j
0.9580598825676712+0.22795623827746714j
0.9493118580732025+0.2503051008542825j
0.9394910305748856+0.2707459580886826j
0.9299006037216904+0.29143161600852485j
0.9173437685625521+0.3107348700576362j
0.9066013384837477+0.32891492096177877j
0.8949661059050966+0.34894537704705564j
0.8815596683670714+0.36927103395889516j
0.8682540311112872+0.38849508778624586j]
fit1: [ 0.6317624585676668 -0.26433287716837656]
[ 0.6317624585676668 -0.26433287716837656 0.3682375414323332
-0.          ] 7.780564980337379e-11
[ 5.1257978310484265e-01 -2.9046287368799739e-01
3.0407461551651627e-01
-6.1340107268805968e-02 2.3061238486950023e-06]
8.118218930650829e-11
E_gs: -0.2904628736879974
test mps sampling took: (0.0013415813446044922, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.03760836586937503
1 Execution time: 0:00:46.851909 ovlp:
(0.9999711999193597+0.00847082371830643j)
2 Execution time: 0:00:46.853906 ovlp:
(0.9998991997177593+0.010774830169524519j)
3 Execution time: 0:00:46.856505 ovlp:
(0.9997047991734376+0.01729084841437567j)
4 Execution time: 0:00:46.859872 ovlp:
(0.999380798266235+0.025470071316199716j)
5 Execution time: 0:00:46.863747 ovlp:

```

```

(0.9992151978025539+0.031021286859603148j)
6 Execution time: 0:00:46.868811 ovlp:
(0.9988047966534306+0.0385669079873423j)
7 Execution time: 0:00:46.874480 ovlp:
(0.9983367953430269+0.044218923812986644j)
8 Execution time: 0:00:46.881540 ovlp:
(0.997832793931823+0.04848853576790013j)
9 Execution time: 0:00:46.888955 ovlp:
(0.99745119286334+0.05622135741980072j)
10 Execution time: 0:00:46.897273 ovlp:
(0.9967743909682947+0.06301097643073406j)
11 Execution time: 0:00:46.905496 ovlp:
(0.9961119891135695+0.07229180241704669j)
12 Execution time: 0:00:46.916017 ovlp:
(0.9955503875410852+0.07324220507817425j)
13 Execution time: 0:00:46.927513 ovlp:
(0.9947439852831588+0.08354543392721503j)
14 Execution time: 0:00:46.938179 ovlp:
(0.9936999823599506+0.08991745176886501j)
15 Execution time: 0:00:46.949292 ovlp:
(0.9927999798399436+0.09522386662682658j)
16 Execution time: 0:00:46.961327 ovlp:
(0.991971977521537+0.10125748352095387j)
17 Execution time: 0:00:46.976074 ovlp:
(0.9911151751224903+0.10640549793539411j)
18 Execution time: 0:00:46.989041 ovlp:
(0.9897039711711193+0.11491592176458099j)
x_points = [np.float64(0.0), np.float64(0.03760836586937503),
np.float64(0.07521673173875006), np.float64(0.11282509760812509),
np.float64(0.1504334634775001), np.float64(0.18804182934687513),
np.float64(0.22565019521625018), np.float64(0.2632585610856252),
np.float64(0.3008669269550002), np.float64(0.3384752928243753),
np.float64(0.37608365869375027), np.float64(0.4136920245631253),
np.float64(0.45130039043250036), np.float64(0.48890875630187536),
np.float64(0.5265171221712504), np.float64(0.5641254880406255),
np.float64(0.6017338539100004), np.float64(0.6393422197793754),
np.float64(0.6769505856487505)] y_points = [1.          +0.j
0.9999711999193597+0.00847082371830643j
0.9998991997177593+0.01077483016952452j
0.9997047991734376+0.01729084841437567j
0.999380798266235 +0.02547007131619972j
0.9992151978025539+0.03102128685960315j
0.9988047966534306+0.0385669079873423j
0.9983367953430269+0.04421892381298664j
0.997832793931823 +0.04848853576790013j
0.99745119286334 +0.05622135741980072j
0.9967743909682947+0.06301097643073406j

```

0.9961119891135695+0.07229180241704669j
 0.9955503875410852+0.07324220507817425j
 0.9947439852831588+0.08354543392721503j
 0.9936999823599506+0.08991745176886501j
 0.9927999798399436+0.09522386662682658j
 0.991971977521537 +0.10125748352095387j
 0.9911151751224903+0.10640549793539411j
 0.9897039711711193+0.11491592176458099j
 fit1: [0.5807976059992781 -0.29232963491675357]
 [0.5807976059992781 -0.29232963491675357 0.4192023940007219
 -0.] 1.2206532974305429e-10
 [5.225855450666114e-01 -2.514712089403651e-01
 3.858417982976649e-01
 -9.695140824050787e-02 6.025036986760861e-07]
 1.2557286445702795e-10
 E_gs: -0.2514712089403651
 test mps sampling took: (0.0012764930725097656, Counter({0: 6, 2: 4}))
 truncated ham size: 10 Number of fitting points: 23
 shots per matrix element: 227272.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.06068519314487662
 1 Execution time: 0:00:47.681106 ovlp:
 (0.9998767996057587+0.010560033792108126j)
 2 Execution time: 0:00:47.683045 ovlp:
 (0.9996479988735965+0.01964166285332114j)
 3 Execution time: 0:00:47.685615 ovlp:
 (0.999225597521912+0.02823929036572914j)
 4 Execution time: 0:00:47.688838 ovlp:
 (0.9987943961420676+0.0400577281847303j)
 5 Execution time: 0:00:47.692661 ovlp:
 (0.9980639938047802+0.04841775493681588j)
 6 Execution time: 0:00:47.697100 ovlp:
 (0.9970607905945299+0.060746594389102126j)
 7 Execution time: 0:00:47.702468 ovlp:
 (0.9962159878911612+0.06950262240839167j)
 8 Execution time: 0:00:47.708343 ovlp:
 (0.9949047836953078+0.08252666408532505j)
 9 Execution time: 0:00:47.715766 ovlp:
 (0.9937695800626563+0.09423070153824487j)
 10 Execution time: 0:00:47.724327 ovlp:
 (0.9914199725439121+0.09914111725157526j)
 11 Execution time: 0:00:47.732517 ovlp:
 (0.9899151677285367+0.11685557393783652j)
 12 Execution time: 0:00:47.741246 ovlp:
 (0.9882695624625999+0.12059558590587494j)
 13 Execution time: 0:00:47.752182 ovlp:
 (0.9856999542398535+0.1302756168819741j)

14 Execution time: 0:00:47.763430 ovlp:
(0.9831303460171072+0.14092365095568304j)
15 Execution time: 0:00:47.775644 ovlp:
(0.9824791439332605+0.1544140941251011j)
16 Execution time: 0:00:47.788296 ovlp:
(0.9787655320497026+0.1626069203421452j)
17 Execution time: 0:00:47.800553 ovlp:
(0.9769087261079235+0.1714245485585555j)
18 Execution time: 0:00:47.813161 ovlp:
(0.9725439121405188+0.18000457601464315j)
19 Execution time: 0:00:47.828494 ovlp:
(0.9703615051568164+0.19161181315780218j)
20 Execution time: 0:00:47.845038 ovlp:
(0.9672550952163046+0.20098384314829798j)
21 Execution time: 0:00:47.860817 ovlp:
(0.9644214861487557+0.20950227040726532j)
22 Execution time: 0:00:47.879399 ovlp:
(0.9608926748565596+0.21721989510366435j)
x_points = [np.float64(0.0), np.float64(0.06068519314487662),
np.float64(0.12137038628975325), np.float64(0.18205557943462986),
np.float64(0.2427407725795065), np.float64(0.30342596572438313),
np.float64(0.3641111588692597), np.float64(0.42479635201413635),
np.float64(0.485481545159013), np.float64(0.5461667383038896),
np.float64(0.6068519314487663), np.float64(0.6675371245936429),
np.float64(0.7282223177385194), np.float64(0.7889075108833961),
np.float64(0.8495927040282727), np.float64(0.9102778971731493),
np.float64(0.970963090318026), np.float64(1.0316482834629026),
np.float64(1.0923334766077792), np.float64(1.1530186697526559),
np.float64(1.2137038628975325), np.float64(1.2743890560424092),
np.float64(1.3350742491872858)] y_points = [1. +0.j
0.9998767996057587+0.01056003379210813j
0.9996479988735965+0.01964166285332114j
0.999225597521912 +0.02823929036572914j
0.9987943961420676+0.0400577281847303j
0.9980639938047802+0.04841775493681588j
0.9970607905945299+0.06074659438910213j
0.9962159878911612+0.06950262240839167j
0.9949047836953078+0.08252666408532505j
0.9937695800626563+0.09423070153824487j
0.9914199725439121+0.09914111725157526j
0.9899151677285367+0.11685557393783652j
0.9882695624625999+0.12059558590587494j
0.9856999542398535+0.1302756168819741j
0.9831303460171072+0.14092365095568304j
0.9824791439332605+0.1544140941251011j
0.9787655320497026+0.1626069203421452j
0.9769087261079235+0.1714245485585555j

```

0.9725439121405188+0.18000457601464315j
0.9703615051568164+0.19161181315780218j
0.9672550952163046+0.20098384314829798j
0.9644214861487557+0.20950227040726532j
0.9608926748565596+0.21721989510366435j]
fit1: [ 0.6357654586055471 -0.2653312881951351]
[ 0.6357654586055471 -0.2653312881951351 0.3642345413944529
-0.          ] 4.805870578552923e-10
[ 4.9050747243951476e-01 -2.9480132561454375e-01
2.9276032424413412e-01
-8.3119837849853107e-02 -8.9982192105243165e-06]
4.630446080923632e-10
E_gs: -0.29480132561454375
test mps sampling took: (0.0012655258178710938, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.10758175101810016
1 Execution time: 0:00:48.342923 ovlp:
(0.99975279990112+0.018032407212962953j)
2 Execution time: 0:00:48.344961 ovlp:
(0.9989031995612798+0.035504414201765755j)
3 Execution time: 0:00:48.347602 ovlp:
(0.9976719990687997+0.053804421521768564j)
4 Execution time: 0:00:48.350921 ovlp:
(0.9960039984015994+0.0710916284366514j)
5 Execution time: 0:00:48.355399 ovlp:
(0.9936519974607989+0.09010923604369436j)
6 Execution time: 0:00:48.360286 ovlp:
(0.9907047962819184+0.10905964362385734j)
x_points = [np.float64(0.0), np.float64(0.10758175101810016),
np.float64(0.21516350203620033), np.float64(0.32274525305430046),
np.float64(0.43032700407240065), np.float64(0.5379087550905008),
np.float64(0.6454905061086009)] y_points = [1.          +0.j
0.99975279990112 +0.01803240721296295j
0.9989031995612798+0.03550441420176575j
0.9976719990687997+0.05380442152176856j
0.9960039984015994+0.0710916284366514j
0.9936519974607989+0.09010923604369436j
0.9907047962819184+0.10905964362385734j]
fit1: [ 0.582513222066475 -0.292520796515947]
[ 0.582513222066475 -0.292520796515947 0.41748677793352496
-0.          ] 1.4905202767713383e-11
[ 5.2460748885928798e-01 -2.5248145912207753e-01
3.8394502565990773e-01
-1.0482983285583870e-01 6.1524260359466744e-07]
1.0642807863848012e-10

```

```

E_gs: -0.25248145912207753
test mps sampling took: (0.0012233257293701172, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.004216475528867005
1 Execution time: 0:00:48.983195 ovlp: (1+0.0012194012194011172j)
2 Execution time: 0:00:48.985174 ovlp: (1+0.0012714012714012402j)
3 Execution time: 0:00:48.988334 ovlp:
(0.9999895999896+0.0032578032578032268j)
4 Execution time: 0:00:48.991841 ovlp:
(0.9999947999948+0.004984204984205043j)
5 Execution time: 0:00:48.995977 ovlp:
(0.9999843999844+0.0017966017966017933j)
6 Execution time: 0:00:49.000967 ovlp:
(0.999973999974+0.005213005213005273j)
7 Execution time: 0:00:49.007153 ovlp:
(0.9999791999792+0.005098605098605047j)
8 Execution time: 0:00:49.013459 ovlp:
(0.9999895999896+0.006606606606606613j)
9 Execution time: 0:00:49.020273 ovlp:
(0.9999843999844+0.007865007865007767j)
10 Execution time: 0:00:49.027697 ovlp:
(0.9999531999531999+0.0062790062790063494j)
11 Execution time: 0:00:49.035628 ovlp:
(0.9999479999479999+0.008868608868608963j)
12 Execution time: 0:00:49.045075 ovlp:
(0.9999791999792+0.00698100698100701j)
13 Execution time: 0:00:49.055393 ovlp:
(0.9999167999167999+0.007979407979407993j)
x_points = [np.float64(0.0), np.float64(0.004216475528867005),
np.float64(0.00843295105773401), np.float64(0.012649426586601014),
np.float64(0.01686590211546802), np.float64(0.021082377644335022),
np.float64(0.02529885317320203), np.float64(0.029515328702069035),
np.float64(0.03373180423093604), np.float64(0.03794827975980304),
np.float64(0.042164755288670044), np.float64(0.046381230817537054),
np.float64(0.05059770634640406), np.float64(0.05481418187527106)]
y_points = [1.          +0.j
1.          +0.00121940121940112j
1.          +0.00127140127140124j
0.9999895999896 +0.00325780325780323j
0.9999947999948 +0.00498420498420504j
0.9999843999844 +0.00179660179660179j
0.999973999974 +0.00521300521300527j
0.9999791999792 +0.00509860509860505j
0.9999895999896 +0.00660660660660661j
0.9999843999844 +0.00786500786500777j

```

```

0.9999531999531999+0.00627900627900635j
0.9999479999479999+0.00886860886860896j
0.9999791999792 +0.00698100698100701j
0.9999167999167999+0.00797940797940799j]
fit1: [ 0.08412611935489005 -2.4051613223366757 ]
[ 0.08412611935489005 -2.4051613223366757 0.08413611925489005
-0.          ] 1.4291680414610052e-10
[ 7.6813496877580587e-02 -2.1962702227602064e+00
7.6820168190966223e-02
-8.9860716180245337e-01 8.6968051449342502e-07]
8.28981905505552e-10
E_gs: -2.1962702227602064
test mps sampling took: (0.001283407211303711, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.015363840693500552
1 Execution time: 0:00:49.232807 ovlp:
(0.9999967999999999+0.00191040000000000898j)
2 Execution time: 0:00:49.234878 ovlp:
(0.9999648000000001+0.006617600000000001j)
3 Execution time: 0:00:49.237541 ovlp:
(0.999952+0.0094528000000000039j)
4 Execution time: 0:00:49.240839 ovlp:
(0.9999423999999999+0.011260800000000007j)
5 Execution time: 0:00:49.244712 ovlp:
(0.9998912+0.014393600000000006j)
6 Execution time: 0:00:49.249274 ovlp:
(0.9998144+0.014268799999999997j)
7 Execution time: 0:00:49.255232 ovlp:
(0.9997567999999999+0.016483199999999992j)
8 Execution time: 0:00:49.262553 ovlp:
(0.9996672+0.0220735999999999916j)
x_points = [np.float64(0.0), np.float64(0.015363840693500552),
np.float64(0.030727681387001105), np.float64(0.04609152208050166),
np.float64(0.06145536277400221), np.float64(0.07681920346750276),
np.float64(0.09218304416100331), np.float64(0.10754688485450387),
np.float64(0.12291072554800442)] y_points = [1.          +0.j
0.9999967999999999+0.001910400000000009j
0.9999648000000001+0.0066176j
0.999952          +0.009452800000000004j
0.9999423999999999+0.011260800000000007j
0.9998912         +0.014393600000000001j
0.9998144         +0.014268799999999997j
0.9997567999999999+0.016483199999999992j
0.9996672         +0.022073599999999992j]
fit1: [ 0.6041434513827691 -0.30209885258137165]

```

```
[ 0.6041434513827691 -0.30209885258137165 0.39585654861723085
-0.          ] 7.149206980309481e-11
[ 5.5028359955676831e-01 -2.6168628115413095e-01
3.6940047637256079e-01
-1.1211059408510488e-01 4.4515241573273470e-07]
1.0421101874838171e-10
E_gs: -0.26168628115413095
test mps sampling took: (0.0012798309326171875, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.0206624508397773
1 Execution time: 0:00:49.473554 ovlp:
(0.99998639997008+0.004756610464543121j)
2 Execution time: 0:00:49.475576 ovlp:
(0.99998639997008+0.008551018812241296j)
3 Execution time: 0:00:49.478172 ovlp:
(0.9998979997755995+0.011665425663936357j)
4 Execution time: 0:00:49.481556 ovlp:
(0.9998231996110392+0.009849821669607683j)
5 Execution time: 0:00:49.485395 ovlp:
(0.9997619994763989+0.021790647939425423j)
6 Execution time: 0:00:49.489911 ovlp:
(0.9997143993716786+0.02148464726622401j)
7 Execution time: 0:00:49.495210 ovlp:
(0.9996531992370383+0.021348646967023432j)
8 Execution time: 0:00:49.501046 ovlp:
(0.9994219987283972+0.0304606670134675j)
9 Execution time: 0:00:49.508011 ovlp:
(0.9992927984441566+0.03258227168099759j)
10 Execution time: 0:00:49.515264 ovlp:
(0.9990343978756753+0.03460187612412757j)
11 Execution time: 0:00:49.524066 ovlp:
(0.9988235974119144+0.03440467569028649j)
12 Execution time: 0:00:49.534037 ovlp:
(0.9987215971875139+0.03957948707487158j)
13 Execution time: 0:00:49.544457 ovlp:
(0.9983611963946322+0.045400299880659745j)
14 Execution time: 0:00:49.556107 ovlp:
(0.9980823957812708+0.05129591285100821j)
15 Execution time: 0:00:49.567666 ovlp:
(0.9977627950781491+0.05317951699493739j)
16 Execution time: 0:00:49.580587 ovlp:
(0.9973819942403874+0.057851127272479985j)
17 Execution time: 0:00:49.594670 ovlp:
(0.9970623935372658+0.060054332119530596j)
x_points = [np.float64(0.0), np.float64(0.0206624508397773),
```

```

np.float64(0.0413249016795546), np.float64(0.06198735251933189),
np.float64(0.0826498033591092), np.float64(0.1033122541988865),
np.float64(0.12397470503866378), np.float64(0.1446371558784411),
np.float64(0.1652996067182184), np.float64(0.1859620575579957),
np.float64(0.206624508397773), np.float64(0.2272869592375503),
np.float64(0.24794941007732757), np.float64(0.26861186091710487),
np.float64(0.2892743117568822), np.float64(0.3099367625966595),
np.float64(0.3305992134364368), np.float64(0.3512616642762141)] y_points
= [1.          +0.j
0.99998639997008 +0.00475661046454312j
0.99998639997008 +0.0085510188122413j
0.9998979997755995+0.01166542566393636j
0.9998231996110392+0.00984982166960768j
0.9997619994763989+0.02179064793942542j
0.9997143993716786+0.02148464726622401j
0.9996531992370383+0.02134864696702343j
0.9994219987283972+0.0304606670134675j
0.9992927984441566+0.03258227168099759j
0.9990343978756753+0.03460187612412757j
0.9988235974119144+0.03440467569028649j
0.9987215971875139+0.03957948707487158j
0.9983611963946322+0.04540029988065974j
0.9980823957812708+0.05129591285100821j
0.9977627950781491+0.05317951699493739j
0.9973819942403874+0.05785112727247999j
0.9970623935372658+0.0600543321195306j ]
fit1: [ 0.5802170775627867 -0.29049415159886227]
[ 0.5802170775627867 -0.29049415159886227 0.41978292243721327
-0.          ] 5.54995478401348e-10
[ 5.1104085173377312e-01 -2.5364388600874044e-01
3.7791495699753480e-01
-1.0327466931102335e-01 9.3895889288279604e-07]
5.592730823772566e-10
E_gs: -0.25364388600874044
test mps sampling took: (0.0012814998626708984, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.004490426540128812
1 Execution time: 0:00:50.268166 ovlp: (1+0.003137403137403183j)
2 Execution time: 0:00:50.270134 ovlp: (1+0.003414603414603423j)
3 Execution time: 0:00:50.272713 ovlp:
(0.9999915999916+0.0016590016590016798j)
4 Execution time: 0:00:50.276054 ovlp:
(0.9999915999916+0.0044814044814045495j)
5 Execution time: 0:00:50.279953 ovlp:
(0.9999915999916+0.0015078015078016094j)

```

```

6 Execution time: 0:00:50.284507 ovlp:
(0.9999915999916+0.003339003339003277j)
7 Execution time: 0:00:50.289741 ovlp:
(0.9999411999412+0.0031626031626030837j)
8 Execution time: 0:00:50.296127 ovlp:
(0.9999663999663999+0.005212205212205223j)
9 Execution time: 0:00:50.302966 ovlp:
(0.9999831999832001+0.006539406539406434j)
10 Execution time: 0:00:50.310927 ovlp:
(0.9999411999412+0.005817005817005727j)
11 Execution time: 0:00:50.320299 ovlp:
(0.9999663999663999+0.010806610806610717j)
12 Execution time: 0:00:50.329560 ovlp:
(0.9999663999663999+0.00828660828660821j)
13 Execution time: 0:00:50.340891 ovlp:
(0.9999243999243999+0.010966210966210976j)
14 Execution time: 0:00:50.352636 ovlp:
(0.9998403998403997+0.010260610260610203j)
15 Execution time: 0:00:50.363456 ovlp:
(0.9998823998823998+0.007942207942208013j)
16 Execution time: 0:00:50.377559 ovlp:
(0.9999159999159999+0.01042861042861043j)
17 Execution time: 0:00:50.391248 ovlp:
(0.9998487998487999+0.010571410571410533j)
18 Execution time: 0:00:50.403846 ovlp:
(0.9998403998403997+0.010537810537810444j)
19 Execution time: 0:00:50.420292 ovlp:
(0.9998151998151998+0.017325017325017233j)
20 Execution time: 0:00:50.435522 ovlp:
(0.9998655998655999+0.017753417753417766j)
21 Execution time: 0:00:50.451184 ovlp:
(0.9997647997647998+0.01446061446061453j)
x_points = [np.float64(0.0), np.float64(0.004490426540128812),
np.float64(0.008980853080257624), np.float64(0.013471279620386436),
np.float64(0.017961706160515248), np.float64(0.02245213270064406),
np.float64(0.02694255924077287), np.float64(0.03143298578090169),
np.float64(0.035923412321030496), np.float64(0.040413838861159304),
np.float64(0.04490426540128812), np.float64(0.049394691941416935),
np.float64(0.05388511848154574), np.float64(0.05837554502167455),
np.float64(0.06286597156180337), np.float64(0.06735639810193218),
np.float64(0.07184682464206099), np.float64(0.0763372511821898),
np.float64(0.08082767772231861), np.float64(0.08531810426244743),
np.float64(0.08980853080257624), np.float64(0.09429895734270505)]
y_points = [1.          +0.j
1.          +0.00313740313740318j
1.          +0.00341460341460342j
0.9999915999916 +0.00165900165900168j

```

```

0.9999915999916 +0.00448140448140455j
0.9999915999916 +0.00150780150780161j
0.9999915999916 +0.00333900333900328j
0.9999411999412 +0.00316260316260308j
0.9999663999663999+0.00521220521220522j
0.9999831999832001+0.00653940653940643j
0.9999411999412 +0.00581700581700573j
0.9999663999663999+0.01080661080661072j
0.9999663999663999+0.00828660828660821j
0.9999243999243999+0.01096621096621098j
0.9998403998403997+0.0102606102606102j
0.9998823998823998+0.00794220794220801j
0.9999159999159999+0.01042861042861043j
0.9998487998487999+0.01057141057141053j
0.9998403998403997+0.01053781053781044j
0.9998151998151998+0.01732501732501723j
0.9998655998655999+0.01775341775341777j
0.9997647997647998+0.01446061446061453j]
fit1: [ 0.5752638910979012 -0.2876352540549571]
[ 0.5752638910979012 -0.2876352540549571 0.4247361089020988
-0.          ] 2.615806208230977e-10
[ 0.5446473479506446 -0.2570226665672753 0.41343301568531354
-0.11867298131530028 -0.          ] 8.653794930815622e-10
E_gs: -0.2570226665672753
test mps sampling took: (0.0013055801391601562, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.26415427182113843
1 Execution time: 0:00:50.659874 ovlp:
(0.9983979983979985+0.04293904293904305j)
2 Execution time: 0:00:50.661884 ovlp:
(0.9939519939519939+0.08894108894108887j)
3 Execution time: 0:00:50.664491 ovlp:
(0.9866259866259866+0.13261513261513258j)
4 Execution time: 0:00:50.668245 ovlp:
(0.9756879756879757+0.17184317184317188j)
5 Execution time: 0:00:50.672380 ovlp:
(0.9625299625299626+0.21576321576321567j)
6 Execution time: 0:00:50.677297 ovlp:
(0.9452919452919453+0.25984525984525986j)
7 Execution time: 0:00:50.682749 ovlp:
(0.9253779253779253+0.2999192999192999j)
8 Execution time: 0:00:50.688872 ovlp:
(0.9043839043839044+0.33502533502533494j)
9 Execution time: 0:00:50.695654 ovlp:
(0.8796518796518797+0.37115737115737124j)

```



```

10 Execution time: 0:00:50.702912  ovlp:
(0.8546798546798546+0.4042534042534043j)
11 Execution time: 0:00:50.711053  ovlp:
(0.8249618249618249+0.43634743634743645j)
12 Execution time: 0:00:50.719808  ovlp:
(0.7932697932697932+0.46370746370746363j)
13 Execution time: 0:00:50.729558  ovlp:
(0.7645237645237646+0.49085149085149093j)
14 Execution time: 0:00:50.739656  ovlp:
(0.7269697269697271+0.518067518067518j)
15 Execution time: 0:00:50.750363  ovlp:
(0.6933216933216932+0.5391635391635392j)
x_points = [np.float64(0.0), np.float64(0.26415427182113843),
np.float64(0.5283085436422769), np.float64(0.7924628154634152),
np.float64(1.0566170872845537), np.float64(1.3207713591056922),
np.float64(1.5849256309268305), np.float64(1.849079902747969),
np.float64(2.1132341745691074), np.float64(2.377388446390246),
np.float64(2.6415427182113844), np.float64(2.905696990032523),
np.float64(3.169851261853661), np.float64(3.4340055336747994),
np.float64(3.698159805495938), np.float64(3.9623140773170764)] y_points
= [1.          +0.j
0.9983979983979985+0.04293904293904305j
0.9939519939519939+0.08894108894108887j
0.9866259866259866+0.13261513261513258j
0.9756879756879757+0.17184317184317188j
0.9625299625299626+0.21576321576321567j
0.9452919452919453+0.25984525984525986j
0.9253779253779253+0.2999192999192999j
0.9043839043839044+0.33502533502533494j
0.8796518796518797+0.37115737115737124j
0.8546798546798546+0.4042534042534043j
0.8249618249618249+0.43634743634743645j
0.7932697932697932+0.46370746370746363j
0.7645237645237646+0.49085149085149093j
0.7269697269697271+0.518067518067518j
0.6933216933216932+0.5391635391635392j ]
fit1: [ 0.6308535315381183 -0.2619913438443858]
[ 0.6191209211941273 -0.2644871703391897  0.369176567294743
-0.00471308718149163] 1.878224955794371e-09
[ 0.43115919377362744 -0.3103896822005301  0.4248162599127342
-0.0786371142376349 -0.00373891450227243] 1.8471844022920047e-10
E_gs: -0.3103896822005301
test mps sampling took: (0.0013284683227539062, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.19654396908528543

```

```

1 Execution time: 0:00:51.066728  ovlp:
(0.9991319999999999+0.032928000000000007j)
2 Execution time: 0:00:51.068759  ovlp:
(0.996648+0.065995999999999994j)
3 Execution time: 0:00:51.071419  ovlp: (0.991968+0.099752000000000006j)
4 Execution time: 0:00:51.075216  ovlp: (0.986764+0.131467999999999992j)
5 Execution time: 0:00:51.079509  ovlp:
(0.9783919999999999+0.16331999999999999j)
6 Execution time: 0:00:51.085036  ovlp: (0.96936+0.196288000000000002j)
7 Execution time: 0:00:51.090874  ovlp:
(0.958064+0.225991999999999997j)
8 Execution time: 0:00:51.096929  ovlp: (0.946592000000000001+0.256448j)
9 Execution time: 0:00:51.103669  ovlp:
(0.9323079999999999+0.286512000000000001j)
10 Execution time: 0:00:51.110979  ovlp:
(0.915728000000000001+0.31639599999999999j)
x_points = [np.float64(0.0), np.float64(0.19654396908528543),
np.float64(0.39308793817057086), np.float64(0.5896319072558562),
np.float64(0.7861758763411417), np.float64(0.9827198454264272),
np.float64(1.1792638145117125), np.float64(1.375807783596998),
np.float64(1.5723517526822834), np.float64(1.768895721767569),
np.float64(1.9654396908528544)] y_points = [1.          +0.j
0.9991319999999999+0.032928000000000007j
0.996648          +0.065995999999999994j
0.991968          +0.099752000000000006j
0.986764          +0.131467999999999992j
0.9783919999999999+0.16331999999999999j
0.96936          +0.196288000000000002j
0.958064          +0.225991999999999997j
0.946592000000000001+0.256448j
0.9323079999999999+0.286512000000000001j
0.915728000000000001+0.31639599999999999j ]
fit1: [ 0.6225438149544393 -0.26977873031366134]
[ 0.6225438149544393 -0.26977873031366134 0.37745618504556067
-0.          ] 2.4726294632307834e-11
[ 5.2051203908897947e-01 -2.8343259535460008e-01
2.9527788766561974e-01
-7.2020425553321304e-02 -4.4347746892271618e-06]
3.778294810226415e-11
E_gs: -0.2834325953546001
test mps sampling took: (0.0013446807861328125, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.09339021781062472
1 Execution time: 0:00:51.594450  ovlp:
(0.9997887999999999+0.0173696000000000096j)

```

```

2 Execution time: 0:00:51.596405  ovlp: (0.9992448+0.0333504j)
3 Execution time: 0:00:51.599125  ovlp:
(0.9978368+0.0496512000000000006j)
4 Execution time: 0:00:51.602890  ovlp:
(0.996928+0.061612800000000002j)
5 Execution time: 0:00:51.607047  ovlp:
(0.99523840000000001+0.07812480000000001j)
6 Execution time: 0:00:51.612010  ovlp: (0.992896+0.095411200000000003j)
7 Execution time: 0:00:51.617425  ovlp:
(0.99038080000000001+0.10772479999999995j)
8 Execution time: 0:00:51.623961  ovlp:
(0.98776320000000001+0.12598400000000001j)
9 Execution time: 0:00:51.630665  ovlp:
(0.9846656+0.14441600000000001j)
10 Execution time: 0:00:51.637921  ovlp:
(0.9809344+0.15356159999999996j)
11 Execution time: 0:00:51.645726  ovlp:
(0.9761792+0.17028479999999999j)
12 Execution time: 0:00:51.655272  ovlp:
(0.97242880000000001+0.1832064j)
13 Execution time: 0:00:51.665980  ovlp:
(0.96804479999999999+0.202790400000000004j)
14 Execution time: 0:00:51.677948  ovlp:
(0.9629824+0.217785600000000002j)
15 Execution time: 0:00:51.688686  ovlp:
(0.95650560000000001+0.22927359999999997j)
16 Execution time: 0:00:51.702848  ovlp: (0.95088+0.24465279999999999j)
x_points = [np.float64(0.0), np.float64(0.09339021781062472),
np.float64(0.18678043562124944), np.float64(0.28017065343187414),
np.float64(0.37356087124249887), np.float64(0.4669510890531236),
np.float64(0.5603413068637483), np.float64(0.653731524674373),
np.float64(0.7471217424849977), np.float64(0.8405119602956225),
np.float64(0.9339021781062472), np.float64(1.0272923959168718),
np.float64(1.1206826137274966), np.float64(1.2140728315381213),
np.float64(1.307463049348746), np.float64(1.4008532671593708),
np.float64(1.4942434849699955)] y_points = [1.          +0.j
0.99978879999999999+0.017369600000000001j
0.9992448          +0.0333504j
0.9978368          +0.049651200000000001j
0.996928          +0.061612800000000002j
0.99523840000000001+0.078124800000000001j
0.992896          +0.095411200000000003j
0.99038080000000001+0.10772479999999995j
0.98776320000000001+0.12598400000000001j
0.9846656          +0.144416000000000001j
0.9809344          +0.15356159999999996j
0.9761792          +0.17028479999999999j

```

0.9724288000000001+0.1832064j
0.9680447999999999+0.20279040000000004j
0.9629824 +0.21778560000000002j
0.9565056000000001+0.22927359999999997j
0.95088 +0.24465279999999999j]
fit1: [0.632982432157276 -0.2664910357596542]
[0.632982432157276 -0.2664910357596542 0.367017567842724
-0.] 2.2517447352685312e-10
[5.267841397487288e-01 -2.836469367732704e-01
2.600941704927816e-01
-7.511062758728489e-02 7.453589844774051e-06]
2.2413265996065788e-10
E_gs: -0.2836469367732704
test mps sampling took: (0.0012922286987304688, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.17168720979127675
1 Execution time: 0:00:52.143156 ovlp: (0.9992896+0.02869760000000001j)
2 Execution time: 0:00:52.145119 ovlp:
(0.9973951999999999+0.056032000000000008j)
3 Execution time: 0:00:52.147716 ovlp:
(0.9942527999999999+0.08394239999999997j)
4 Execution time: 0:00:52.151096 ovlp:
(0.9896832+0.11558399999999991j)
5 Execution time: 0:00:52.154993 ovlp:
(0.9837248000000001+0.13954559999999994j)
6 Execution time: 0:00:52.159633 ovlp:
(0.9761280000000001+0.17027199999999998j)
7 Execution time: 0:00:52.164919 ovlp: (0.968032+0.2007424j)
8 Execution time: 0:00:52.170893 ovlp:
(0.9586304000000001+0.22417280000000006j)
9 Execution time: 0:00:52.178280 ovlp: (0.9475264000000001+0.253536j)
10 Execution time: 0:00:52.186745 ovlp:
(0.9360447999999999+0.2801536j)
11 Execution time: 0:00:52.194948 ovlp:
(0.9226368+0.30425600000000001j)
12 Execution time: 0:00:52.203566 ovlp:
(0.9074751999999999+0.32706560000000007j)
13 Execution time: 0:00:52.213530 ovlp:
(0.8926335999999999+0.35091840000000001j)
14 Execution time: 0:00:52.224374 ovlp:
(0.8761216000000001+0.3731776j)
15 Execution time: 0:00:52.236491 ovlp:
(0.8626815999999999+0.3968191999999999j)
16 Execution time: 0:00:52.250394 ovlp:
(0.8409279999999999+0.41795840000000006j)

```

x_points = [np.float64(0.0), np.float64(0.17168720979127675),
np.float64(0.3433744195825535), np.float64(0.5150616293738303),
np.float64(0.686748839165107), np.float64(0.8584360489563837),
np.float64(1.0301232587476605), np.float64(1.2018104685389372),
np.float64(1.373497678330214), np.float64(1.5451848881214907),
np.float64(1.7168720979127674), np.float64(1.8885593077040441),
np.float64(2.060246517495321), np.float64(2.231933727286598),
np.float64(2.4036209370778745), np.float64(2.575308146869151),
np.float64(2.746995356660428)] y_points = [1.          +0.j
0.9992896      +0.02869760000000001j
0.9973951999999999+0.056032000000000008j
0.9942527999999999+0.08394239999999997j
0.9896832      +0.11558399999999999j
0.9837248000000001+0.13954559999999994j
0.9761280000000001+0.17027199999999998j
0.968032      +0.2007424j
0.9586304000000001+0.22417280000000006j
0.9475264000000001+0.253536j
0.9360447999999999+0.2801536j
0.9226368      +0.30425600000000001j
0.9074751999999999+0.32706560000000007j
0.8926335999999999+0.35091840000000001j
0.8761216000000001+0.3731776j
0.8626815999999999+0.3968191999999999j
0.8409279999999999+0.41795840000000006j]
fit1: [ 0.6354565735076555 -0.26297498466555413]
[ 0.6354565735076555 -0.26297498466555413  0.3645434264923445
-0.          ] 2.446011929090709e-10
[ 4.9308938024049620e-01 -2.9300886938306114e-01
3.2033669746880922e-01
-7.2948372933322569e-02  1.0522641538912914e-06]
1.7511515446037372e-10
E_gs: -0.29300886938306114
test mps sampling took: (0.0013089179992675781, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.06163337697614486
1 Execution time: 0:00:52.673433 ovlp:
(0.9999111999644801+0.012222004888801985j)
2 Execution time: 0:00:52.675402 ovlp:
(0.9996519998608+0.020053208021283186j)
3 Execution time: 0:00:52.678095 ovlp:
(0.9992055996822398+0.03185401274160515j)
4 Execution time: 0:00:52.681855 ovlp:
(0.9985743994297598+0.04130281652112666j)
5 Execution time: 0:00:52.686019 ovlp:

```

```

(0.9977727991091196+0.052474820989928395j)
6 Execution time: 0:00:52.690956 ovlp:
(0.9969591987836794+0.06080762432304976j)
x_points = [np.float64(0.0), np.float64(0.06163337697614486),
np.float64(0.12326675395228973), np.float64(0.1849001309284346),
np.float64(0.24653350790457945), np.float64(0.3081668848807243),
np.float64(0.3698002618568692)] y_points = [1.          +0.j
0.9999111999644801+0.01222200488880198j
0.9996519998608  +0.02005320802128319j
0.9992055996822398+0.03185401274160515j
0.9985743994297598+0.04130281652112666j
0.9977727991091196+0.05247482098992839j
0.9969591987836794+0.06080762432304976j]
fit1: [ 0.5851357317732675 -0.29255960842410106]
[ 0.5851357317732675 -0.29255960842410106 0.4148642682267325
-0.          ] 2.1495659502382046e-11
[ 5.2914069364595462e-01 -2.5316520136491660e-01
3.8327044764154300e-01
-1.0954109285976008e-01 5.6577567427868867e-07]
1.748061139205582e-10
E_gs: -0.2531652013649166
test mps sampling took: (0.0013048648834228516, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.040481166001399435
1 Execution time: 0:00:53.357005 ovlp:
(0.9999663999663999+0.00913780913780915j)
2 Execution time: 0:00:53.358978 ovlp:
(0.9998683998683999+0.011503811503811523j)
3 Execution time: 0:00:53.361603 ovlp:
(0.9996919996919997+0.019805819805819747j)
4 Execution time: 0:00:53.364969 ovlp:
(0.9994567994567995+0.02666582666582662j)
5 Execution time: 0:00:53.368888 ovlp:
(0.9991011991011991+0.03320383320383313j)
6 Execution time: 0:00:53.373465 ovlp:
(0.9986671986671987+0.04115024115024113j)
7 Execution time: 0:00:53.378777 ovlp:
(0.9981071981071981+0.047136647136647225j)
x_points = [np.float64(0.0), np.float64(0.040481166001399435),
np.float64(0.08096233200279887), np.float64(0.1214434980041983),
np.float64(0.16192466400559774), np.float64(0.2024058300069972),
np.float64(0.2428869960083966), np.float64(0.28336816200979603)]
y_points = [1.          +0.j
0.9999663999663999+0.00913780913780915j
0.9998683998683999+0.01150381150381152j

```

```

0.9996919996919997+0.01980581980581975j
0.9994567994567995+0.02666582666582662j
0.9991011991011991+0.03320383320383313j
0.9986671986671987+0.04115024115024113j
0.9981071981071981+0.04713664713664723j]
fit1: [ 0.34134869464749806 -0.5124254170313025 ]
[ 0.34134869464749806 -0.5124254170313025  0.34135869454749806
 -0.          ] 9.261146535923235e-11
[ 2.9036632670019985e-01 -4.3608323383427267e-01
 2.9028137241552904e-01
 -1.6217286016902155e-01  1.4985923600078469e-06]
5.25233666834054e-11
E_gs: -0.43608323383427267
test mps sampling took: (0.0012478828430175781, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2867602742524697
1 Execution time: 0:00:53.775587 ovlp:
(0.9980419980419981+0.04922064922064928j)
2 Execution time: 0:00:53.777559 ovlp:
(0.9923263923263923+0.09657349657349656j)
3 Execution time: 0:00:53.780282 ovlp:
(0.9838299838299838+0.14228954228954227j)
4 Execution time: 0:00:53.783993 ovlp:
(0.971087571087571+0.18807598807598813j)
5 Execution time: 0:00:53.788158 ovlp:
(0.956013156013156+0.23511203511203504j)
6 Execution time: 0:00:53.793319 ovlp:
(0.9354915354915354+0.2762476762476762j)
7 Execution time: 0:00:53.798839 ovlp:
(0.9139623139623139+0.31860651860651856j)
8 Execution time: 0:00:53.805572 ovlp:
(0.8891110891110892+0.35940335940335943j)
9 Execution time: 0:00:53.812560 ovlp:
(0.8587862587862587+0.39755139755139757j)
10 Execution time: 0:00:53.819798 ovlp:
(0.8287342287342288+0.4333058333058333j)
11 Execution time: 0:00:53.827907 ovlp:
(0.7960949960949961+0.4647086647086647j)
x_points = [np.float64(0.0), np.float64(0.2867602742524697),
np.float64(0.5735205485049394), np.float64(0.860280822757409),
np.float64(1.1470410970098788), np.float64(1.4338013712623485),
np.float64(1.720561645514818), np.float64(2.007321919767288),
np.float64(2.2940821940197575), np.float64(2.5808424682722273),
np.float64(2.867602742524697), np.float64(3.154363016777167)] y_points =
[1.          +0.j

```

0.9980419980419981+0.04922064922064928j
 0.9923263923263923+0.09657349657349656j
 0.9838299838299838+0.14228954228954227j
 0.971087571087571 +0.18807598807598813j
 0.956013156013156 +0.23511203511203504j
 0.9354915354915354+0.2762476762476762j
 0.9139623139623139+0.31860651860651856j
 0.8891110891110892+0.35940335940335943j
 0.8587862587862587+0.39755139755139757j
 0.8287342287342288+0.4333058333058333j
 0.7960949960949961+0.4647086647086647j]
 fit1: [0.6316842337210975 -0.2633429630024426]
 [0.6316842337210975 -0.2633429630024426 0.3683157662789025
 -0.] 4.042373625175005e-11
 [5.1958332269297458e-01 -2.8551212824470684e-01
 2.4443644223837260e-01
 -7.7446530402388178e-02 1.7313652049406858e-06]
 1.4287749122407818e-11
 E_gs: -0.28551212824470684
 test mps sampling took: (0.0013132095336914062, Counter({2: 5, 0: 5}))
 truncated ham size: 10 Number of fitting points: 13
 shots per matrix element: 416666.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.12849658115613388
 1 Execution time: 0:00:54.167068 ovlp:
 (0.9996111993779191+0.02335203736325986j)
 2 Execution time: 0:00:54.169087 ovlp:
 (0.9985167976268763+0.043233669173870615j)
 3 Execution time: 0:00:54.171707 ovlp:
 (0.9965967945548713+0.06465610344976547j)
 4 Execution time: 0:00:54.174955 ovlp:
 (0.9943935910297457+0.08448013516821629j)
 5 Execution time: 0:00:54.178925 ovlp:
 (0.9908463853542167+0.10658417053467284j)
 6 Execution time: 0:00:54.183489 ovlp:
 (0.9864639783423654+0.12792500468000756j)
 7 Execution time: 0:00:54.188821 ovlp:
 (0.9813039700863522+0.1519634431415091j)
 8 Execution time: 0:00:54.196751 ovlp:
 (0.9768255629209006+0.17157627452203927j)
 9 Execution time: 0:00:54.203963 ovlp:
 (0.970297552476084+0.1906947051115282j)
 10 Execution time: 0:00:54.211314 ovlp:
 (0.9634623415397465+0.2087235339576543j)
 11 Execution time: 0:00:54.219122 ovlp:
 (0.9561759298814878+0.23260837217339558j)
 12 Execution time: 0:00:54.229248 ovlp:


```

(0.9475311160497857+0.24972039955263936j)
x_points = [np.float64(0.0), np.float64(0.12849658115613388),
np.float64(0.25699316231226776), np.float64(0.38548974346840165),
np.float64(0.5139863246245355), np.float64(0.6424829057806694),
np.float64(0.7709794869368033), np.float64(0.8994760680929372),
np.float64(1.027972649249071), np.float64(1.1564692304052049),
np.float64(1.2849658115613387), np.float64(1.4134623927174728),
np.float64(1.5419589738736066)] y_points = [1.          +0.j
0.9996111993779191+0.02335203736325986j
0.9985167976268763+0.04323366917387061j
0.9965967945548713+0.06465610344976547j
0.9943935910297457+0.08448013516821629j
0.9908463853542167+0.10658417053467284j
0.9864639783423654+0.12792500468000756j
0.9813039700863522+0.1519634431415091j
0.9768255629209006+0.17157627452203927j
0.970297552476084 +0.1906947051115282j
0.9634623415397465+0.2087235339576543j
0.9561759298814878+0.23260837217339558j
0.9475311160497857+0.24972039955263936j]
fit1: [ 0.62505098806644 -0.26817991848983164]
[ 0.62505098806644 -0.26817991848983164 0.37494901193356
-0.          ] 5.937017932531363e-11
[ 5.1240332309690895e-01 -2.8846230851176424e-01
2.8024594411973253e-01
-7.1317656387929876e-02 4.1772822368664395e-06]
6.5495484208945e-11
E_gs: -0.28846230851176424
test mps sampling took: (0.0012743473052978516, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.13494407279452614
1 Execution time: 0:00:54.656482 ovlp:
(0.9996199987079957+0.025091485311049988j)
2 Execution time: 0:00:54.658475 ovlp:
(0.9983203942893406+0.04623475719817449j)
3 Execution time: 0:00:54.661048 ovlp:
(0.9960707866406746+0.06824443203106889j)
4 Execution time: 0:00:54.664283 ovlp:
(0.9936387783718466+0.08549649068806842j)
5 Execution time: 0:00:54.668130 ovlp:
(0.9890939629194739+0.11083497683892118j)
6 Execution time: 0:00:54.672720 ovlp:
(0.9852179497410292+0.13160584745988135j)
7 Execution time: 0:00:54.678094 ovlp:
(0.9809847353481003+0.15787913678906507j)

```

```

8 Execution time: 0:00:54.684004  ovlp:
(0.9735063099214538+0.18117321598893432j)
9 Execution time: 0:00:54.690724  ovlp:
(0.9668334872338566+0.20094088319900294j)
10 Execution time: 0:00:54.698024  ovlp:
(0.9601530645204193+0.2200701482385039j)
11 Execution time: 0:00:54.705965  ovlp:
(0.9512990344167169+0.24353142800685523j)
12 Execution time: 0:00:54.714548  ovlp:
(0.944117009997834+0.2636866965347682j)
13 Execution time: 0:00:54.724981  ovlp:
(0.9343357767416409+0.28503516911957494j)
14 Execution time: 0:00:54.736637  ovlp:
(0.9232473390409528+0.30425563446915715j)
15 Execution time: 0:00:54.747421  ovlp:
(0.9118245002033007+0.32180409413391997j)
16 Execution time: 0:00:54.759806  ovlp:
(0.9011996640788578+0.3435629681140915j)
17 Execution time: 0:00:54.773603  ovlp:
(0.8876868181351816+0.36041982542740647j)
18 Execution time: 0:00:54.786532  ovlp:
(0.8735583700984584+0.37724628263736104j)
19 Execution time: 0:00:54.799921  ovlp:
(0.8623483319843288+0.3966567486329453j)
x_points = [np.float64(0.0), np.float64(0.13494407279452614),
np.float64(0.2698881455890523), np.float64(0.4048322183835784),
np.float64(0.5397762911781046), np.float64(0.6747203639726307),
np.float64(0.8096644367671568), np.float64(0.944608509561683),
np.float64(1.079552582356209), np.float64(1.2144966551507352),
np.float64(1.3494407279452614), np.float64(1.4843848007397875),
np.float64(1.6193288735343137), np.float64(1.7542729463288398),
np.float64(1.889217019123366), np.float64(2.0241610919178923),
np.float64(2.159105164712418), np.float64(2.294049237506944),
np.float64(2.4289933103014705), np.float64(2.563937383095997)] y_points
= [1.          +0.j
0.9996199987079957+0.02509148531104999j
0.9983203942893406+0.04623475719817449j
0.9960707866406746+0.06824443203106889j
0.9936387783718466+0.08549649068806842j
0.9890939629194739+0.11083497683892118j
0.9852179497410292+0.13160584745988135j
0.9809847353481003+0.15787913678906507j
0.9735063099214538+0.18117321598893432j
0.9668334872338566+0.20094088319900294j
0.9601530645204193+0.2200701482385039j
0.9512990344167169+0.24353142800685523j
0.944117009997834 +0.2636866965347682j

```

```

0.9343357767416409+0.28503516911957494j
0.9232473390409528+0.30425563446915715j
0.9118245002033007+0.32180409413391997j
0.9011996640788578+0.3435629681140915j
0.8876868181351816+0.36041982542740647j
0.8735583700984584+0.37724628263736104j
0.8623483319843288+0.3966567486329453j ]
fit1: [ 0.6362250286831007 -0.26287787372906246]
[ 0.6362250286831007 -0.26287787372906246 0.3637749713168993
-0.          ] 3.5576505403179166e-10
[ 5.1747860904786269e-01 -2.8792903105065365e-01
2.7960130243884923e-01
-6.6862060185310435e-02 3.9100704899204640e-06]
3.8592029456116173e-10
E_gs: -0.28792903105065365
test mps sampling took: (0.001302480697631836, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.11098965195557103
1 Execution time: 0:00:55.175951 ovlp:
(0.9997119997119996+0.01778221778221778j)
2 Execution time: 0:00:55.178380 ovlp:
(0.9988479988479988+0.04042624042624032j)
3 Execution time: 0:00:55.181119 ovlp:
(0.9974871974871975+0.056248256248256245j)
4 Execution time: 0:00:55.184448 ovlp:
(0.9958599958599959+0.07437067437067446j)
5 Execution time: 0:00:55.188636 ovlp:
(0.9929835929835931+0.09300069300069302j)
6 Execution time: 0:00:55.193325 ovlp:
(0.99001359001359+0.10902070902070893j)
7 Execution time: 0:00:55.198583 ovlp:
(0.9867807867807867+0.1304947304947306j)
8 Execution time: 0:00:55.205323 ovlp:
(0.9825543825543825+0.15013995013995007j)
9 Execution time: 0:00:55.212642 ovlp:
(0.978018378018378+0.16536436536436527j)
x_points = [np.float64(0.0), np.float64(0.11098965195557103),
np.float64(0.2219793039114207), np.float64(0.3329689558667131),
np.float64(0.44395860782228413), np.float64(0.5549482597778552),
np.float64(0.6659379117334262), np.float64(0.7769275636889972),
np.float64(0.8879172156445683), np.float64(0.9989068676001394)]
y_points = [1.          +0.j
0.9997119997119996+0.01778221778221778j
0.9988479988479988+0.04042624042624032j
0.9974871974871975+0.05624825624825625j

```

```

0.9958599958599959+0.07437067437067446j
0.9929835929835931+0.09300069300069302j
0.99001359001359 +0.10902070902070893j
0.9867807867807867+0.1304947304947306j
0.9825543825543825+0.15013995013995007j
0.978018378018378 +0.16536436536436527j]
fit1: [ 0.6139984004590758 -0.2744873151026405]
[ 0.6139984004590758 -0.2744873151026405 0.38600159954092417
-0.          ] 7.717534319307137e-11
[ 5.3743580695539472e-01 -2.6272731075665173e-01
3.3064054748715099e-01
-8.4026875433309459e-02 1.8004200776089765e-06]
1.5335689697989117e-10
E_gs: -0.26272731075665173
test mps sampling took: (0.0012826919555664062, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.16448102314144386
1 Execution time: 0:00:55.697142 ovlp:
(0.9993460000000001+0.0263880000000000078j)
2 Execution time: 0:00:55.699118 ovlp:
(0.9976039999999999+0.056445999999999996j)
3 Execution time: 0:00:55.701709 ovlp:
(0.9945839999999999+0.082662000000000001j)
4 Execution time: 0:00:55.705117 ovlp:
(0.9902679999999999+0.11025799999999997j)
5 Execution time: 0:00:55.708984 ovlp:
(0.984934+0.13705199999999995j)
x_points = [np.float64(0.0), np.float64(0.16448102314144386),
np.float64(0.3289620462828877), np.float64(0.4934430694243316),
np.float64(0.6579240925657754), np.float64(0.8224051157072193)] y_points
= [1.          +0.j
0.9993460000000001+0.026388000000000008j
0.9976039999999999+0.056446j
0.9945839999999999+0.082662000000000001j
0.9902679999999999+0.11025799999999997j
0.984934          +0.13705199999999995j]
fit1: [ 0.5837088082065491 -0.2918164544228956]
[ 0.5837088082065491 -0.2918164544228956 0.41629119179345087
-0.          ] 2.3131963836934032e-11
[ 5.1878822547298287e-01 -2.4903722077944984e-01
3.7744779504167536e-01
-1.0476800125734147e-01 7.5050897586691599e-07]
4.91591572314745e-11
E_gs: -0.24903722077944984
test mps sampling took: (0.0012717247009277344, Counter({2: 5, 0: 5}))

```

truncated ham size: 10 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2539095567922357

- 1 Execution time: 0:00:56.286877 ovlp:
(0.9986751981452775+0.04465226251316756j)
- 2 Execution time: 0:00:56.288887 ovlp:
(0.9942959920143888+0.0900451260631765j)
- 3 Execution time: 0:00:56.291948 ovlp:
(0.986770381478534+0.12853797995317184j)
- 4 Execution time: 0:00:56.295460 ovlp:
(0.9764571670400339+0.16002962404147358j)
- 5 Execution time: 0:00:56.299580 ovlp:
(0.964846750785451+0.21131969584757426j)
- 6 Execution time: 0:00:56.304360 ovlp:
(0.9479187270862179+0.24928814900340868j)
- 7 Execution time: 0:00:56.309834 ovlp:
(0.9327387058341883+0.28404579766411664j)
- 8 Execution time: 0:00:56.315719 ovlp:
(0.9107966751153451+0.32579545611363847j)
- 9 Execution time: 0:00:56.322462 ovlp:
(0.890271446380025+0.35614629860481806j)
- 10 Execution time: 0:00:56.329687 ovlp:
(0.8649346109084552+0.3898919458487242j)
- 11 Execution time: 0:00:56.337697 ovlp:
(0.8381533734147228+0.4229291921008689j)
- 12 Execution time: 0:00:56.346377 ovlp:
(0.8089985325979456+0.45266363372908724j)
- 13 Execution time: 0:00:56.356011 ovlp:
(0.7782244895142854+0.47812006936809714j)
- 14 Execution time: 0:00:56.365992 ovlp:
(0.7466132452585434+0.5017089023924632j)
- 15 Execution time: 0:00:56.376626 ovlp:
(0.7115795962114346+0.5254265355971499j)
- 16 Execution time: 0:00:56.387915 ovlp:
(0.6817991545188162+0.5471385659939925j)
- 17 Execution time: 0:00:56.400696 ovlp:
(0.6509791113707559+0.56121458570042j)
- 18 Execution time: 0:00:56.415954 ovlp:
(0.609247852946994+0.5742418039385255j)
- 19 Execution time: 0:00:56.429609 ovlp:
(0.5774894084851718+0.5867906215068701j)
- 20 Execution time: 0:00:56.446950 ovlp:
(0.5413149578409411+0.5980330372462521j)
- 21 Execution time: 0:00:56.461902 ovlp:
(0.5049841069777499+0.6016118422565793j)
- 22 Execution time: 0:00:56.478431 ovlp:

```

(0.471486860081604+0.6057978481169874j)
23 Execution time: 0:00:56.495922 ovlp:
(0.43573561002985395+0.6083094516332324j)
x_points = [np.float64(0.0), np.float64(0.2539095567922357),
np.float64(0.5078191135844714), np.float64(0.7617286703767071),
np.float64(1.0156382271689428), np.float64(1.2695477839611784),
np.float64(1.5234573407534142), np.float64(1.77736689754565),
np.float64(2.0312764543378856), np.float64(2.285186011130121),
np.float64(2.539095567922357), np.float64(2.793005124714593),
np.float64(3.0469146815068284), np.float64(3.300824238299064),
np.float64(3.5547337950913), np.float64(3.8086433518835356),
np.float64(4.062552908675771), np.float64(4.316462465468007),
np.float64(4.570372022260242), np.float64(4.824281579052478),
np.float64(5.078191135844714), np.float64(5.33210069263695),
np.float64(5.586010249429186), np.float64(5.839919806221421)] y_points =
[1.          +0.j
 0.9986751981452775 +0.04465226251316756j
 0.9942959920143888 +0.0900451260631765j
 0.986770381478534 +0.12853797995317184j
 0.9764571670400339 +0.16002962404147358j
 0.964846750785451 +0.21131969584757426j
 0.9479187270862179 +0.24928814900340868j
 0.9327387058341883 +0.28404579766411664j
 0.9107966751153451 +0.32579545611363847j
 0.890271446380025 +0.35614629860481806j
 0.8649346109084552 +0.3898919458487242j
 0.8381533734147228 +0.4229291921008689j
 0.8089985325979456 +0.45266363372908724j
 0.7782244895142854 +0.47812006936809714j
 0.7466132452585434 +0.5017089023924632j
 0.7115795962114346 +0.5254265355971499j
 0.6817991545188162 +0.5471385659939925j
 0.6509791113707559 +0.56121458570042j
 0.609247852946994 +0.5742418039385255j
 0.5774894084851718 +0.5867906215068701j
 0.5413149578409411 +0.5980330372462521j
 0.5049841069777499 +0.6016118422565793j
 0.471486860081604 +0.6057978481169874j
 0.43573561002985395+0.6083094516332324j ]
fit1: [ 0.6195673407304173 -0.25881426612980557]
[ 0.4118361299188607 -0.31427825864041414 0.4701515374841717
-0.07967141679998459] 4.152653981349003e-09
[ 0.417297038114102 -0.31535865728004236 0.3664429334363983
-0.07211352720862715 -0.0439622823182319 ] 3.448933892849927e-09
E_gs: -0.31535865728004236
test mps sampling took: (0.0013387203216552734, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 11

```

```

shots per matrix element: 500000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.16557357671801617
1 Execution time: 0:00:56.973992 ovlp:
(0.9993559999999999+0.025868000000000002j)
2 Execution time: 0:00:56.976041 ovlp:
(0.9975959999999999+0.055304000000000002j)
3 Execution time: 0:00:56.979231 ovlp:
(0.99477600000000001+0.08299999999999996j)
4 Execution time: 0:00:56.982783 ovlp:
(0.99029600000000001+0.111720000000000004j)
5 Execution time: 0:00:56.986991 ovlp:
(0.9845919999999999+0.13745999999999992j)
6 Execution time: 0:00:56.991753 ovlp: (0.97776+0.16691199999999995j)
7 Execution time: 0:00:56.997310 ovlp: (0.97062+0.192800000000000008j)
8 Execution time: 0:00:57.003294 ovlp:
(0.96276000000000001+0.22089599999999998j)
9 Execution time: 0:00:57.010650 ovlp:
(0.952156+0.24348799999999993j)
10 Execution time: 0:00:57.018998 ovlp:
(0.939664+0.26806400000000001j)
x_points = [np.float64(0.0), np.float64(0.16557357671801617),
np.float64(0.33114715343603235), np.float64(0.4967207301540485),
np.float64(0.6622943068720647), np.float64(0.8278678835900809),
np.float64(0.993441460308097), np.float64(1.1590150370261132),
np.float64(1.3245886137441294), np.float64(1.4901621904621456),
np.float64(1.6557357671801618)] y_points = [1.          +0.j
0.9993559999999999+0.025868j
0.9975959999999999+0.055304000000000002j
0.99477600000000001+0.08299999999999996j
0.99029600000000001+0.111720000000000004j
0.9845919999999999+0.13745999999999992j
0.97776          +0.16691199999999995j
0.97062          +0.192800000000000008j
0.96276000000000001+0.22089599999999998j
0.952156          +0.24348799999999993j
0.939664          +0.26806400000000001j ]
fit1: [ 0.6378457061012185 -0.26425128883436066]
[ 0.6378457061012185 -0.26425128883436066 0.3621542938987815
-0.          ] 4.909118803411803e-11
[ 5.2695788253109643e-01 -2.8638948249765472e-01
3.0234917539864337e-01
-5.9919103444473126e-02 2.1930503182985713e-06]
5.003345840094019e-11
E_gs: -0.2863894824976547
test mps sampling took: (0.0012965202331542969, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 16

```

shots per matrix element: 333333.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.1042450814415729

1 Execution time: 0:00:57.559054 ovlp:

(0.9998079998079998+0.017703017703017743j)

2 Execution time: 0:00:57.561084 ovlp:

(0.9990279990279991+0.03614103614103614j)

3 Execution time: 0:00:57.563806 ovlp:

(0.9977199977199978+0.05054705054705044j)

4 Execution time: 0:00:57.567593 ovlp:

(0.9961419961419962+0.07065307065307058j)

5 Execution time: 0:00:57.571720 ovlp:

(0.9939519939519939+0.08662508662508661j)

6 Execution time: 0:00:57.576865 ovlp:

(0.991119991119991+0.10551310551310555j)

7 Execution time: 0:00:57.582597 ovlp:

(0.9884199884199885+0.11958311958311962j)

8 Execution time: 0:00:57.588774 ovlp:

(0.9845259845259846+0.1415251415251415j)

9 Execution time: 0:00:57.595375 ovlp:

(0.9810999810999812+0.15693915693915694j)

10 Execution time: 0:00:57.602607 ovlp:

(0.9753639753639753+0.17418917418917412j)

11 Execution time: 0:00:57.611360 ovlp:

(0.9715299715299714+0.19348519348519355j)

12 Execution time: 0:00:57.621166 ovlp:

(0.9647679647679648+0.20648720648720653j)

13 Execution time: 0:00:57.630478 ovlp:

(0.9596619596619596+0.2202932202932204j)

14 Execution time: 0:00:57.640708 ovlp:

(0.9538839538839539+0.23757323757323756j)

15 Execution time: 0:00:57.653111 ovlp:

(0.9473019473019473+0.25760725760725767j)

x_points = [np.float64(0.0), np.float64(0.1042450814415729),

np.float64(0.2084901628831458), np.float64(0.3127352443247187),

np.float64(0.4169803257662916), np.float64(0.5212254072078646),

np.float64(0.6254704886494374), np.float64(0.7297155700910103),

np.float64(0.8339606515325833), np.float64(0.9382057329741562),

np.float64(1.0424508144157292), np.float64(1.146695895857302),

np.float64(1.2509409772988749), np.float64(1.3551860587404478),

np.float64(1.4594311401820206), np.float64(1.5636762216235935)] y_points

= [1. +0.j

0.9998079998079998+0.01770301770301774j

0.9990279990279991+0.03614103614103614j

0.9977199977199978+0.05054705054705044j

0.9961419961419962+0.07065307065307058j

0.9939519939519939+0.08662508662508661j

0.991119991119991 +0.1055131055131055j
 0.9884199884199885+0.11958311958311962j
 0.9845259845259846+0.1415251415251415j
 0.9810999810999812+0.15693915693915694j
 0.9753639753639753+0.17418917418917412j
 0.9715299715299714+0.19348519348519355j
 0.9647679647679648+0.20648720648720653j
 0.9596619596619596+0.2202932202932204j
 0.9538839538839539+0.23757323757323756j
 0.9473019473019473+0.25760725760725767j]
 fit1: [0.6401310461144846 -0.26303433418029687]
 [0.6401310461144846 -0.26303433418029687 0.35986895388551543
 -0.] 1.7057301822000555e-10
 [5.218493324545684e-01 -2.857336851075164e-01
 2.664877337429947e-01
 -7.287504912814068e-02 3.460549989037340e-06]
 1.6650645845572186e-10
 E_gs: -0.2857336851075164
 test mps sampling took: (0.0012993812561035156, Counter({0: 7, 2: 3}))
 truncated ham size: 10 Number of fitting points: 20
 shots per matrix element: 263157.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.03360970508493489
 1 Execution time: 0:00:58.083584 ovlp: (1+0.005270617920100973j)
 2 Execution time: 0:00:58.085554 ovlp:
 (0.9998859996123988+0.010203034690317914j)
 3 Execution time: 0:00:58.089096 ovlp:
 (0.9998023993281577+0.017803060530405812j)
 4 Execution time: 0:00:58.092397 ovlp:
 (0.9996047986563155+0.020531469806997382j)
 5 Execution time: 0:00:58.096399 ovlp:
 (0.999399597958633+0.029324699703978885j)
 6 Execution time: 0:00:58.102004 ovlp:
 (0.9991715971834305+0.03250151050513561j)
 7 Execution time: 0:00:58.108079 ovlp:
 (0.9988295960206264+0.04172034184916229j)
 8 Execution time: 0:00:58.115014 ovlp:
 (0.998365994444381+0.04434235076399262j)
 9 Execution time: 0:00:58.123439 ovlp:
 (0.9980087932298969+0.05083277283142773j)
 10 Execution time: 0:00:58.132056 ovlp:
 (0.9971955904650076+0.057315594873022624j)
 11 Execution time: 0:00:58.140891 ovlp:
 (0.9968231891988433+0.06329681520917174j)
 12 Execution time: 0:00:58.151207 ovlp:
 (0.9964735880101991+0.07133004252214459j)
 13 Execution time: 0:00:58.161269 ovlp:

```

(0.9956071850644292+0.07471965404682379j)
14 Execution time: 0:00:58.173131 ovlp:
(0.9949155827129812+0.07798766515806155j)
15 Execution time: 0:00:58.186314 ovlp:
(0.994193580258173+0.08292008192827849j)
16 Execution time: 0:00:58.199721 ovlp:
(0.9936995785785672+0.0925417146418297j)
17 Execution time: 0:00:58.213403 ovlp:
(0.992559574702554+0.09780853254901056j)
18 Execution time: 0:00:58.226924 ovlp:
(0.9923467739790315+0.10331855128307432j)
19 Execution time: 0:00:58.242142 ovlp:
(0.9910395695345364+0.10453455541748835j)
x_points = [np.float64(0.0), np.float64(0.03360970508493489),
np.float64(0.06721941016986978), np.float64(0.10082911525480467),
np.float64(0.13443882033973956), np.float64(0.16804852542467444),
np.float64(0.20165823050960935), np.float64(0.23526793559454423),
np.float64(0.2688776406794791), np.float64(0.302487345764414),
np.float64(0.3360970508493489), np.float64(0.36970675593428376),
np.float64(0.4033164610192187), np.float64(0.4369261661041536),
np.float64(0.47053587118908846), np.float64(0.5041455762740233),
np.float64(0.5377552813589582), np.float64(0.5713649864438931),
np.float64(0.604974691528828), np.float64(0.6385843966137629)] y_points
= [1.          +0.j
1.          +0.00527061792010097j
0.9998859996123988+0.01020303469031791j
0.9998023993281577+0.01780306053040581j
0.9996047986563155+0.02053146980699738j
0.999399597958633 +0.02932469970397888j
0.9991715971834305+0.03250151050513561j
0.9988295960206264+0.04172034184916229j
0.998365994444381 +0.04434235076399262j
0.9980087932298969+0.05083277283142773j
0.9971955904650076+0.05731559487302262j
0.9968231891988433+0.06329681520917174j
0.9964735880101991+0.07133004252214459j
0.9956071850644292+0.07471965404682379j
0.9949155827129812+0.07798766515806155j
0.994193580258173 +0.08292008192827849j
0.9936995785785672+0.0925417146418297j
0.992559574702554 +0.09780853254901056j
0.9923467739790315+0.10331855128307432j
0.9910395695345364+0.10453455541748835j]
fit1: [ 0.6257356512314125 -0.2705367962151114]
[ 0.6257356512314125 -0.2705367962151114  0.3742643487685875
-0.          ] 1.4505114487301347e-10
[ 5.7241946012816358e-01 -2.3689174468424193e-01

```

3.4807736527609262e-01
-9.8458500501005145e-02 5.4784245227158387e-07]
2.539918443366426e-10
E_gs: -0.23689174468424193
test mps sampling took: (0.0013492107391357422, Counter({2: 8, 0: 2}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1903395624091369
1 Execution time: 0:00:58.915533 ovlp:
(0.9991487971059101+0.02829109618972714j)
2 Execution time: 0:00:58.917546 ovlp:
(0.9968915894314041+0.06550082270279711j)
3 Execution time: 0:00:58.920720 ovlp:
(0.9928559757103175+0.09709413012004231j)
4 Execution time: 0:00:58.924303 ovlp:
(0.9872395566144925+0.12811743559928113j)
5 Execution time: 0:00:58.928441 ovlp:
(0.9794647301800825+0.1573547350060991j)
6 Execution time: 0:00:58.933134 ovlp:
(0.9716215035131119+0.19191205250097854j)
7 Execution time: 0:00:58.938650 ovlp:
(0.9610498675695498+0.22013854847106473j)
8 Execution time: 0:00:58.944707 ovlp:
(0.9497106290161386+0.25119225405366374j)
9 Execution time: 0:00:58.951967 ovlp:
(0.9372009864833541+0.2825879607990667j)
10 Execution time: 0:00:58.960463 ovlp:
(0.9229965381882299+0.3052360378025285j)
11 Execution time: 0:00:58.968673 ovlp:
(0.9050528771797823+0.3330901325064506j)
12 Execution time: 0:00:58.977456 ovlp:
(0.8886064212618323+0.3571366142644885j)
13 Execution time: 0:00:58.986872 ovlp:
(0.8693327557313695+0.3833795034903118j)
14 Execution time: 0:00:58.998060 ovlp:
(0.8522098975136516+0.405883180002812j)
15 Execution time: 0:00:59.009329 ovlp:
(0.8316746276937341+0.43289367183848415j)
16 Execution time: 0:00:59.020909 ovlp:
(0.8094141520081168+0.45154413525005976j)
17 Execution time: 0:00:59.034973 ovlp:
(0.7840604658055836+0.4727406073180649j)
18 Execution time: 0:00:59.047974 ovlp:
(0.7635327960115064+0.4930782764661399j)
19 Execution time: 0:00:59.061665 ovlp:
(0.739440714098428+0.5119795407304384j)

```

x_points = [np.float64(0.0), np.float64(0.1903395624091369),
np.float64(0.3806791248182738), np.float64(0.5710186872274108),
np.float64(0.7613582496365476), np.float64(0.9516978120456845),
np.float64(1.1420373744548216), np.float64(1.3323769368639584),
np.float64(1.5227164992730953), np.float64(1.7130560616822321),
np.float64(1.903395624091369), np.float64(2.093735186500506),
np.float64(2.284074748909643), np.float64(2.47441431131878),
np.float64(2.664753873727917), np.float64(2.8550934361370537),
np.float64(3.0454329985461905), np.float64(3.2357725609553274),
np.float64(3.4261121233644642), np.float64(3.616451685773601)] y_points =
[1.          +0.j
 0.9991487971059101+0.02829109618972714j
 0.9968915894314041+0.06550082270279711j
 0.9928559757103175+0.09709413012004231j
 0.9872395566144925+0.12811743559928113j
 0.9794647301800825+0.1573547350060991j
 0.9716215035131119+0.19191205250097854j
 0.9610498675695498+0.22013854847106473j
 0.9497106290161386+0.25119225405366374j
 0.9372009864833541+0.2825879607990667j
 0.9229965381882299+0.3052360378025285j
 0.9050528771797823+0.3330901325064506j
 0.8886064212618323+0.3571366142644885j
 0.8693327557313695+0.3833795034903118j
 0.8522098975136516+0.405883180002812j
 0.8316746276937341+0.43289367183848415j
 0.8094141520081168+0.45154413525005976j
 0.7840604658055836+0.4727406073180649j
 0.7635327960115064+0.4930782764661399j
 0.739440714098428 +0.5119795407304384j ]
fit1: [ 0.6359390993931522 -0.26159610392225124]
[ 0.6359390993931522 -0.26159610392225124  0.3640609006068478
 -0.          ] 2.5901802744596256e-09
[ 4.9048467236568083e-01 -2.9376180889104259e-01
 3.3032961993920540e-01
 -7.2026434485559773e-02  4.6959381572808808e-06]
8.395668477027431e-10
E_gs: -0.2937618088910426
test mps sampling took: (0.0014939308166503906, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.29534443189469467
1 Execution time: 0:00:59.434733 ovlp:
(0.9978975941132635+0.049496538590308115j)
2 Execution time: 0:00:59.436898 ovlp:
(0.9920871778440981+0.1002854807993463j)

```

```

3 Execution time: 0:00:59.440024 ovlp:
(0.9820071496200189+0.14954081871429237j)
4 Execution time: 0:00:59.443450 ovlp:
(0.9691551136343182+0.19734175255690722j)
5 Execution time: 0:00:59.448025 ovlp:
(0.9515510643429801+0.24003787210604188j)
6 Execution time: 0:00:59.453253 ovlp:
(0.9315782084189836+0.2848435975620731j)
7 Execution time: 0:00:59.459641 ovlp:
(0.9074797409432747+0.32898692116337935j)
8 Execution time: 0:00:59.466489 ovlp:
(0.8822508703024368+0.3698254355112194j)
9 Execution time: 0:00:59.474015 ovlp:
(0.8512907836141941+0.4089719451214464j)
10 Execution time: 0:00:59.482114 ovlp:
(0.818753892510899+0.4428552399946719j)
11 Execution time: 0:00:59.491235 ovlp:
(0.7860370009036026+0.4723825226710634j)
12 Execution time: 0:00:59.500695 ovlp:
(0.7477760937730626+0.5069642194998145j)
13 Execution time: 0:00:59.511421 ovlp:
(0.7110559909567746+0.5284634796977432j)
14 Execution time: 0:00:59.521805 ovlp:
(0.670786278201579+0.5479395342306959j)
15 Execution time: 0:00:59.532485 ovlp:
(0.6319565694783946+0.568099590678854j)
16 Execution time: 0:00:59.544099 ovlp:
(0.5893828502719807+0.581383627874158j)
17 Execution time: 0:00:59.558435 ovlp:
(0.5494803385449478+0.5936308621664141j)
18 Execution time: 0:00:59.571548 ovlp:
(0.5057258160322848+0.6069940995834788j)
x_points = [np.float64(0.0), np.float64(0.29534443189469467),
np.float64(0.5906888637893893), np.float64(0.886033295684084),
np.float64(1.1813777275787787), np.float64(1.4767221594734734),
np.float64(1.772066591368168), np.float64(2.0674110232628626),
np.float64(2.3627554551575574), np.float64(2.658099887052252),
np.float64(2.953444318946947), np.float64(3.2487887508416415),
np.float64(3.544133182736336), np.float64(3.8394776146310305),
np.float64(4.134822046525725), np.float64(4.43016647842042),
np.float64(4.725510910315115), np.float64(5.020855342209809),
np.float64(5.316199774104504)] y_points = [1.          +0.j
0.9978975941132635+0.04949653859030811j
0.9920871778440981+0.1002854807993463j
0.9820071496200189+0.14954081871429237j
0.9691551136343182+0.19734175255690722j
0.9515510643429801+0.24003787210604188j

```

```

0.9315782084189836+0.2848435975620731j
0.9074797409432747+0.32898692116337935j
0.8822508703024368+0.3698254355112194j
0.8512907836141941+0.4089719451214464j
0.818753892510899 +0.4428552399946719j
0.7860370009036026+0.4723825226710634j
0.7477760937730626+0.5069642194998145j
0.7110559909567746+0.5284634796977432j
0.670786278201579 +0.5479395342306959j
0.6319565694783946+0.568099590678854j
0.5893828502719807+0.581383627874158j
0.5494803385449478+0.5936308621664141j
0.5057258160322848+0.6069940995834788j ]
fit1: [ 0.625037296884255 -0.25952585475294876]
[ 0.4031142519671639 -0.31608815359055537 0.4412418367973154
-0.09052870941621012] 1.2927138419907757e-09
[ 0.3917709154794598 -0.3245636099603766 0.391455827845775
-0.08071795153301299 -0.04647555400952111] 4.1239518850542393e-10
E_gs: -0.3245636099603766
test mps sampling took: (0.0015227794647216797, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.10641655675853054
1 Execution time: 0:01:00.120852 ovlp:
(0.9997335997335997+0.018538218538218576j)
2 Execution time: 0:01:00.122975 ovlp:
(0.9989631989631991+0.03589023589023599j)
3 Execution time: 0:01:00.125799 ovlp:
(0.9976743976743976+0.04970344970344964j)
4 Execution time: 0:01:00.129417 ovlp:
(0.9959895959895959+0.0740754740754741j)
5 Execution time: 0:01:00.134502 ovlp:
(0.9934551934551934+0.08675468675468667j)
6 Execution time: 0:01:00.139829 ovlp:
(0.9904275904275903+0.10734310734310726j)
7 Execution time: 0:01:00.145584 ovlp:
(0.988011988011988+0.12540072540072544j)
8 Execution time: 0:01:00.152824 ovlp:
(0.9837603837603837+0.14408834408834403j)
9 Execution time: 0:01:00.159399 ovlp:
(0.9792531792531793+0.16070956070956077j)
x_points = [np.float64(0.0), np.float64(0.10641655675853054),
np.float64(0.21283311351706108), np.float64(0.3192496702755916),
np.float64(0.42566622703412216), np.float64(0.5320827837926527),
np.float64(0.6384993405511832), np.float64(0.7449158973097137),
np.float64(0.8513324540682443), np.float64(0.9577490108267749)]

```

```

y_points = [1.          +0.j
0.9997335997335997+0.01853821853821858j
0.9989631989631991+0.03589023589023599j
0.9976743976743976+0.04970344970344964j
0.9959895959895959+0.0740754740754741j
0.9934551934551934+0.08675468675468667j
0.9904275904275903+0.10734310734310726j
0.988011988011988 +0.12540072540072544j
0.9837603837603837+0.14408834408834403j
0.9792531792531793+0.16070956070956077j]
fit1: [ 0.5769117986028405 -0.2915194649107368]
[ 0.5769117986028405 -0.2915194649107368  0.4230882013971595
-0.          ] 2.124917355146831e-10
[ 4.6570455565635616e-01 -3.0437059232833014e-01
3.4812566551375645e-01
-7.6118566562208764e-02  3.9240583320899992e-06]
1.7738632288332927e-10
E_gs: -0.30437059232833014
test mps sampling took: (0.001314401626586914, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.17367852649396862
1 Execution time: 0:01:00.724493 ovlp:
(0.9993235977002322+0.02934749978149931j)
2 Execution time: 0:01:00.726591 ovlp:
(0.9972943908009286+0.0581059975603917j)
3 Execution time: 0:01:00.729307 ovlp:
(0.99395797945713+0.08783729864681544j)
4 Execution time: 0:01:00.733113 ovlp:
(0.9887823618600304+0.11771300022420084j)
5 Execution time: 0:01:00.737313 ovlp:
(0.9832039428934058+0.14530869404955982j)
6 Execution time: 0:01:00.742622 ovlp:
(0.9760599186037233+0.17307918846924086j)
7 Execution time: 0:01:00.748396 ovlp:
(0.9672590886809016+0.2008572829147619j)
8 Execution time: 0:01:00.754526 ovlp:
(0.9576678560707106+0.22981338136549656j)
9 Execution time: 0:01:00.761508 ovlp:
(0.9462222171555383+0.2528034595317623j)
10 Execution time: 0:01:00.768892 ovlp:
(0.9346625778527646+0.2806575542356844j)
11 Execution time: 0:01:00.776846 ovlp:
(0.9215601333044532+0.30842044862952545j)
12 Execution time: 0:01:00.785840 ovlp:
(0.9070668840274057+0.33270253118860604j)

```

```

13 Execution time: 0:01:00.796123  ovlp:
(0.8909016290655387+0.3540510037734128j)
14 Execution time: 0:01:00.808179  ovlp:
(0.8739079712871023+0.3765926804151134j)
15 Execution time: 0:01:00.819834  ovlp:
(0.8568915134311457+0.4002363608036268j)
16 Execution time: 0:01:00.832869  ovlp:
(0.8389402523968581+0.41954802646329004j)
17 Execution time: 0:01:00.845603  ovlp:
(0.8205177897604852+0.4416793017096259j)
18 Execution time: 0:01:00.858411  ovlp:
(0.7992073173048788+0.46024616483696046j)
19 Execution time: 0:01:00.871832  ovlp:
(0.7800400521361772+0.48049263367495443j)
x_points = [np.float64(0.0), np.float64(0.17367852649396862),
np.float64(0.34735705298793723), np.float64(0.5210355794819058),
np.float64(0.6947141059758745), np.float64(0.8683926324698431),
np.float64(1.0420711589638116), np.float64(1.2157496854577803),
np.float64(1.389428211951749), np.float64(1.5631067384457176),
np.float64(1.7367852649396862), np.float64(1.9104637914336549),
np.float64(2.0841423179276233), np.float64(2.257820844421592),
np.float64(2.4314993709155606), np.float64(2.605177897409529),
np.float64(2.778856423903498), np.float64(2.9525349503974665),
np.float64(3.126213476891435), np.float64(3.299892003385404)] y_points =
[1.          +0.j
0.9993235977002322+0.02934749978149931j
0.9972943908009286+0.0581059975603917j
0.99395797945713  +0.08783729864681544j
0.9887823618600304+0.11771300022420084j
0.9832039428934058+0.14530869404955982j
0.9760599186037233+0.17307918846924086j
0.9672590886809016+0.2008572829147619j
0.9576678560707106+0.22981338136549656j
0.9462222171555383+0.2528034595317623j
0.9346625778527646+0.2806575542356844j
0.9215601333044532+0.30842044862952545j
0.9070668840274057+0.33270253118860604j
0.8909016290655387+0.3540510037734128j
0.8739079712871023+0.3765926804151134j
0.8568915134311457+0.4002363608036268j
0.8389402523968581+0.41954802646329004j
0.8205177897604852+0.4416793017096259j
0.7992073173048788+0.46024616483696046j
0.7800400521361772+0.48049263367495443j]
fit1: [ 0.6341359671113885 -0.26223010889200643]
[ 0.6341359671113885 -0.26223010889200643 0.36586403288861147
-0.          ] 5.689947847308508e-10

```



```

[ 4.8756036232956179e-01 -2.9494127406583837e-01
 3.2623105036248229e-01
 -7.2664275850972904e-02 -1.0220784042318134e-06]
1.3701780991898358e-10
E_gs: -0.29494127406583837
test mps sampling took: (0.013300657272338867, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.056951854386036865
1 Execution time: 0:01:01.276295 ovlp:
(0.9999471999472+0.01034661034661033j)
2 Execution time: 0:01:01.278331 ovlp:
(0.9996963996963997+0.018288618288618386j)
3 Execution time: 0:01:01.281007 ovlp:
(0.9993971993971993+0.031026631026630946j)
4 Execution time: 0:01:01.284528 ovlp:
(0.9988031988031989+0.03973423973423973j)
5 Execution time: 0:01:01.288476 ovlp:
(0.9981783981783983+0.0484990484990484j)
6 Execution time: 0:01:01.292922 ovlp:
(0.9974875974875974+0.05777865777865787j)
7 Execution time: 0:01:01.298058 ovlp:
(0.9964139964139964+0.06873466873466882j)
8 Execution time: 0:01:01.304064 ovlp:
(0.9954987954987955+0.07545787545787541j)
9 Execution time: 0:01:01.310620 ovlp:
(0.994037994037994+0.0863698863698863j)
10 Execution time: 0:01:01.317583 ovlp:
(0.9928499928499928+0.09652069652069661j)
11 Execution time: 0:01:01.325482 ovlp:
(0.9912747912747912+0.1080091080091079j)
x_points = [np.float64(0.0), np.float64(0.056951854386036865),
np.float64(0.11390370877207373), np.float64(0.1708555631581106),
np.float64(0.22780741754414746), np.float64(0.28475927193018435),
np.float64(0.3417111263162212), np.float64(0.39866298070225803),
np.float64(0.4556148350882949), np.float64(0.5125666894743318),
np.float64(0.5695185438603687), np.float64(0.6264703982464055)]
y_points = [1.          +0.j
0.9999471999472 +0.01034661034661033j
0.9996963996963997+0.01828861828861839j
0.9993971993971993+0.03102663102663095j
0.9988031988031989+0.03973423973423973j
0.9981783981783983+0.0484990484990484j
0.9974875974875974+0.05777865777865787j
0.9964139964139964+0.06873466873466882j
0.9954987954987955+0.07545787545787541j

```

0.994037994037994 +0.0863698863698863j
0.9928499928499928+0.09652069652069661j
0.9912747912747912+0.1080091080091079j]
fit1: [0.5842715585807599 -0.293651707500012]
[0.5842715585807599 -0.293651707500012 0.41572844141924015
-0.] 3.486671450236386e-11
[5.2309653559654257e-01 -2.5149824577646146e-01
3.8050308191447546e-01
-1.0353347028220310e-01 6.5370192783432723e-07]
3.4254759238143746e-11
E_gs: -0.25149824577646146
test mps sampling took: (0.0013203620910644531, Counter({2: 8, 0: 2}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.281370363886017
1 Execution time: 0:01:01.919090 ovlp:
(0.9984831975731161+0.04435687097099361j)
2 Execution time: 0:01:01.921079 ovlp:
(0.9928479885567816+0.09348974958359935j)
3 Execution time: 0:01:01.923911 ovlp:
(0.9843231749170798+0.13822582116131388j)
4 Execution time: 0:01:01.927602 ovlp:
(0.9727359563775302+0.19065150504240802j)
5 Execution time: 0:01:01.931620 ovlp:
(0.9565119304190888+0.23363077380923802j)
6 Execution time: 0:01:01.936338 ovlp:
(0.9381087009739215+0.27437323899718247j)
7 Execution time: 0:01:01.941463 ovlp:
(0.9166526666442667+0.31698770718033153j)
8 Execution time: 0:01:01.947799 ovlp:
(0.8923838278141245+0.35361176577882514j)
9 Execution time: 0:01:01.954478 ovlp:
(0.8657149851439763+0.3933750294000471j)
10 Execution time: 0:01:01.961775 ovlp:
(0.8356285370056593+0.4244022790436466j)
11 Execution time: 0:01:01.969677 ovlp:
(0.8024124838599742+0.4545367272587637j)
12 Execution time: 0:01:01.978083 ovlp:
(0.7685532296851676+0.4848631757810813j)
13 Execution time: 0:01:01.987179 ovlp:
(0.737113179381087+0.5148536237657981j)
14 Execution time: 0:01:01.996829 ovlp:
(0.6962363139781023+0.538671261874019j)
15 Execution time: 0:01:02.007030 ovlp:
(0.6600250560400898+0.5548664877863805j)
16 Execution time: 0:01:02.018120 ovlp:

(0.6214137942620708+0.5677305083688133j)
17 Execution time: 0:01:02.029893 ovlp:
(0.5842041347266156+0.5832249331598931j)
18 Execution time: 0:01:02.042183 ovlp:
(0.5436536698458718+0.5989017582428131j)
19 Execution time: 0:01:02.055029 ovlp:
(0.505877609404175+0.6000057600092159j)
20 Execution time: 0:01:02.068560 ovlp:
(0.4670935473496758+0.6083865734185174j)
21 Execution time: 0:01:02.085110 ovlp:
(0.42663908262253214+0.6101913763062021j)
22 Execution time: 0:01:02.100323 ovlp:
(0.39177182683492284+0.606264970023952j)
23 Execution time: 0:01:02.116034 ovlp:
(0.3577109723375558+0.6036249657999453j)
24 Execution time: 0:01:02.132182 ovlp:
(0.3209813135701016+0.5911161457858332j)
x_points = [np.float64(0.0), np.float64(0.281370363886017),
np.float64(0.562740727772034), np.float64(0.844111091658051),
np.float64(1.125481455544068), np.float64(1.406851819430085),
np.float64(1.688222183316102), np.float64(1.969592547202119),
np.float64(2.250962911088136), np.float64(2.532333274974153),
np.float64(2.81370363886017), np.float64(3.0950740027461867),
np.float64(3.376444366632204), np.float64(3.657814730518221),
np.float64(3.939185094404238), np.float64(4.220555458290255),
np.float64(4.501925822176272), np.float64(4.783296186062289),
np.float64(5.064666549948306), np.float64(5.346036913834323),
np.float64(5.62740727772034), np.float64(5.908777641606357),
np.float64(6.190148005492373), np.float64(6.471518369378391),
np.float64(6.752888733264408)] y_points = [1. +0.j
0.9984831975731161 +0.04435687097099361j
0.9928479885567816 +0.09348974958359935j
0.9843231749170798 +0.13822582116131388j
0.9727359563775302 +0.19065150504240802j
0.9565119304190888 +0.23363077380923802j
0.9381087009739215 +0.27437323899718247j
0.9166526666442667 +0.31698770718033153j
0.8923838278141245 +0.35361176577882514j
0.8657149851439763 +0.3933750294000471j
0.8356285370056593 +0.4244022790436466j
0.8024124838599742 +0.4545367272587637j
0.7685532296851676 +0.4848631757810813j
0.737113179381087 +0.5148536237657981j
0.6962363139781023 +0.538671261874019j
0.6600250560400898 +0.5548664877863805j
0.6214137942620708 +0.5677305083688133j
0.5842041347266156 +0.5832249331598931j

0.5436536698458718 +0.5989017582428131j
0.505877609404175 +0.6000057600092159j
0.4670935473496758 +0.6083865734185174j
0.42663908262253214+0.6101913763062021j
0.39177182683492284+0.606264970023952j
0.3577109723375558 +0.6036249657999453j
0.3209813135701016 +0.5911161457858332j]
fit1: [0.6136235840037434 -0.25624182696842923]
[0.34339492064477695 -0.3339186789209123 0.5004355342040664
-0.1059313150590954] 2.827438441617604e-09
[0.37578957163832616 -0.3291957842730878 0.3840694783295039
-0.08343959275016741 -0.05424858595903317] 2.163719736246048e-09
E_gs: -0.3291957842730878
test mps sampling took: (0.0013213157653808594, Counter({2: 8, 0: 2}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2741960875244526
1 Execution time: 0:01:02.706204 ovlp:
(0.9984447956454279+0.046450930062604145j)
2 Execution time: 0:01:02.708185 ovlp:
(0.9935271818761093+0.09140065592183655j)
3 Execution time: 0:01:02.710899 ovlp:
(0.984959157885642+0.14074239407870337j)
4 Execution time: 0:01:02.714269 ovlp:
(0.9732375250650702+0.18544731925249391j)
5 Execution time: 0:01:02.718137 ovlp:
(0.9585710839990351+0.22761783732994445j)
6 Execution time: 0:01:02.722580 ovlp:
(0.9412622355342595+0.2656555438355228j)
7 Execution time: 0:01:02.728546 ovlp:
(0.9201085763040135+0.30752366106625106j)
8 Execution time: 0:01:02.735518 ovlp:
(0.8977165136062382+0.34580616825727106j)
9 Execution time: 0:01:02.742603 ovlp:
(0.8712276394373903+0.3830518725452432j)
10 Execution time: 0:01:02.749752 ovlp:
(0.8433995615187722+0.4153799630638966j)
11 Execution time: 0:01:02.757652 ovlp:
(0.8130298764836541+0.44904005731216046j)
12 Execution time: 0:01:02.766307 ovlp:
(0.7798161834853137+0.4768537351904585j)
13 Execution time: 0:01:02.775511 ovlp:
(0.7459472886524083+0.5033210092988261j)
14 Execution time: 0:01:02.786881 ovlp:
(0.7086295841628356+0.525374671049079j)
15 Execution time: 0:01:02.797801 ovlp:

```
(0.6746886891283295+0.5468523311865274j)
16 Execution time: 0:01:02.808896 ovlp:
(0.6373421845581169+0.5663931859009206j)
17 Execution time: 0:01:02.820711 ovlp:
(0.6004276811975073+0.5827012315634483j)
18 Execution time: 0:01:02.832995 ovlp:
(0.5604675693091941+0.5914924561788772j)
x_points = [np.float64(0.0), np.float64(0.2741960875244526),
np.float64(0.5483921750489053), np.float64(0.8225882625733578),
np.float64(1.0967843500978105), np.float64(1.3709804376222632),
np.float64(1.6451765251467156), np.float64(1.9193726126711683),
np.float64(2.193568700195621), np.float64(2.4677647877200735),
np.float64(2.7419608752445264), np.float64(3.016156962768979),
np.float64(3.2903530502934313), np.float64(3.564549137817884),
np.float64(3.8387452253423366), np.float64(4.1129413128667895),
np.float64(4.387137400391242), np.float64(4.6613334879156945),
np.float64(4.935529575440147)] y_points = [1.          +0.j
0.9984447956454279+0.04645093006260415j
0.9935271818761093+0.09140065592183655j
0.984959157885642 +0.14074239407870337j
0.9732375250650702+0.18544731925249391j
0.9585710839990351+0.22761783732994445j
0.9412622355342595+0.2656555438355228j
0.9201085763040135+0.30752366106625106j
0.8977165136062382+0.34580616825727106j
0.8712276394373903+0.3830518725452432j
0.8433995615187722+0.4153799630638966j
0.8130298764836541+0.44904005731216046j
0.7798161834853137+0.4768537351904585j
0.7459472886524083+0.5033210092988261j
0.7086295841628356+0.525374671049079j
0.6746886891283295+0.5468523311865274j
0.6373421845581169+0.5663931859009206j
0.6004276811975073+0.5827012315634483j
0.5604675693091941+0.5914924561788772j ]
fit1: [ 0.6252948823791031 -0.26032958124397 ]
[ 0.3730892300826513 -0.329895763268601  0.5438903247248744
-0.08393458858057887] 2.9440622575071744e-10
[ 0.41203687844429937 -0.31796825388803074  0.41210966875352334
-0.07385749046754736 -0.03818030330317772] 4.304039456538422e-10
E_gs: -0.31796825388803074
test mps sampling took: (0.001285552978515625, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.21508148406783767
1 Execution time: 0:01:03.195951 ovlp:
```

```

(0.9989835989835989+0.035004235004234996j)
2 Execution time: 0:01:03.197949 ovlp:
(0.9959255959255959+0.07330187330187332j)
3 Execution time: 0:01:03.200553 ovlp:
(0.9907731907731907+0.1073579073579074j)
4 Execution time: 0:01:03.203718 ovlp:
(0.9838871838871839+0.1454751454751455j)
5 Execution time: 0:01:03.207530 ovlp:
(0.9743655743655744+0.18047718047718053j)
6 Execution time: 0:01:03.212577 ovlp:
(0.9636031636031637+0.21535601535601545j)
7 Execution time: 0:01:03.218618 ovlp:
(0.9515603515603515+0.24738804738804743j)
8 Execution time: 0:01:03.225070 ovlp:
(0.9353111353111354+0.27917807917807913j)
9 Execution time: 0:01:03.231878 ovlp:
(0.9197439197439197+0.3093225093225094j)
10 Execution time: 0:01:03.239209 ovlp:
(0.9007403007403008+0.3392601392601393j)
11 Execution time: 0:01:03.247146 ovlp:
(0.8805838805838806+0.3697565697565697j)
x_points = [np.float64(0.0), np.float64(0.21508148406783767),
np.float64(0.43016296813567534), np.float64(0.645244452203513),
np.float64(0.8603259362713507), np.float64(1.0754074203391883),
np.float64(1.290488904407026), np.float64(1.5055703884748637),
np.float64(1.7206518725427014), np.float64(1.935733356610539),
np.float64(2.1508148406783767), np.float64(2.365896324746214)] y_points
= [1.          +0.j
0.9989835989835989+0.035004235004235j
0.9959255959255959+0.07330187330187332j
0.9907731907731907+0.1073579073579074j
0.9838871838871839+0.1454751454751455j
0.9743655743655744+0.18047718047718053j
0.9636031636031637+0.21535601535601545j
0.9515603515603515+0.24738804738804743j
0.9353111353111354+0.27917807917807913j
0.9197439197439197+0.3093225093225094j
0.9007403007403008+0.3392601392601393j
0.8805838805838806+0.3697565697565697j ]
fit1: [ 0.6367368286025997 -0.26364499699861654]
[ 0.6367368286025997 -0.26364499699861654 0.3632631713974003
-0.          ] 1.1810898839651953e-10
[ 5.0886711729570278e-01 -2.8976607736815141e-01
3.0491175655723696e-01
-6.8315557546636083e-02 1.4088776396009572e-06]
6.854719258969734e-11
E_gs: -0.2897660773681514

```

test mps sampling took: (0.001291513442993164, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.08558915726823983
1 Execution time: 0:01:03.717181 ovlp:
(0.9998343997681596+0.010649014908620913j)
2 Execution time: 0:01:03.719253 ovlp:
(0.9994755992658391+0.032554245575943774j)
3 Execution time: 0:01:03.721897 ovlp:
(0.9986475981066374+0.04398986158580631j)
4 Execution time: 0:01:03.725623 ovlp:
(0.9972583961617547+0.057440280416392486j)
5 Execution time: 0:01:03.729844 ovlp:
(0.9960715945002323+0.06754189455865234j)
6 Execution time: 0:01:03.734714 ovlp:
(0.9940843917181483+0.0845619183866857j)
7 Execution time: 0:01:03.740362 ovlp:
(0.9920235888330244+0.1039739455635238j)
8 Execution time: 0:01:03.746407 ovlp:
(0.9901007861411006+0.11546476165066633j)
9 Execution time: 0:01:03.752771 ovlp:
(0.9865311811436537+0.1294027811638936j)
10 Execution time: 0:01:03.759990 ovlp:
(0.9837435772410081+0.13746199244678947j)
11 Execution time: 0:01:03.767849 ovlp:
(0.9793735711229996+0.1562116186962661j)
12 Execution time: 0:01:03.777250 ovlp:
(0.9755555657777921+0.16905483667677146j)
13 Execution time: 0:01:03.787302 ovlp:
(0.9728507619910667+0.18122645371703516j)
14 Execution time: 0:01:03.797066 ovlp:
(0.9685451559632183+0.1972620761669066j)
15 Execution time: 0:01:03.807421 ovlp:
(0.963724349214089+0.2117888965044552j)
16 Execution time: 0:01:03.819957 ovlp:
(0.9601271441780019+0.22465971452360023j)
17 Execution time: 0:01:03.831924 ovlp:
(0.9538159353423095+0.23949013528618934j)
18 Execution time: 0:01:03.844259 ovlp:
(0.9481947274726186+0.24946294924812884j)
19 Execution time: 0:01:03.857144 ovlp:
(0.9414511180315652+0.259647363506309j)
20 Execution time: 0:01:03.870569 ovlp:
(0.9370167118233965+0.2774217883905037j)
21 Execution time: 0:01:03.887035 ovlp:
(0.9297947017125825+0.2891978048769268j)

```

22 Execution time: 0:01:03.902065  ovlp:
(0.9229498921298489+0.30579462811247926j)
23 Execution time: 0:01:03.917537  ovlp:
(0.9158290821607151+0.3130442382619336j)
x_points = [np.float64(0.0), np.float64(0.08558915726823983),
np.float64(0.17117831453647966), np.float64(0.2567674718047195),
np.float64(0.34235662907295933), np.float64(0.4279457863411992),
np.float64(0.513534943609439), np.float64(0.5991241008776789),
np.float64(0.6847132581459187), np.float64(0.7703024154141584),
np.float64(0.8558915726823983), np.float64(0.9414807299506381),
np.float64(1.027069887218878), np.float64(1.1126590444871178),
np.float64(1.1982482017553577), np.float64(1.2838373590235974),
np.float64(1.3694265162918373), np.float64(1.4550156735600772),
np.float64(1.540604830828317), np.float64(1.6261939880965568),
np.float64(1.7117831453647967), np.float64(1.7973723026330364),
np.float64(1.8829614599012763), np.float64(1.9685506171695162)] y_points
= [1.          +0.j
0.9998343997681596+0.01064901490862091j
0.9994755992658391+0.03255424557594377j
0.9986475981066374+0.04398986158580631j
0.9972583961617547+0.05744028041639249j
0.9960715945002323+0.06754189455865234j
0.9940843917181483+0.0845619183866857j
0.9920235888330244+0.1039739455635238j
0.9901007861411006+0.11546476165066633j
0.9865311811436537+0.1294027811638936j
0.9837435772410081+0.13746199244678947j
0.9793735711229996+0.1562116186962661j
0.9755555657777921+0.16905483667677146j
0.9728507619910667+0.18122645371703516j
0.9685451559632183+0.1972620761669066j
0.963724349214089 +0.2117888965044552j
0.9601271441780019+0.22465971452360023j
0.9538159353423095+0.23949013528618934j
0.9481947274726186+0.24946294924812884j
0.9414511180315652+0.259647363506309j
0.9370167118233965+0.2774217883905037j
0.9297947017125825+0.2891978048769268j
0.9229498921298489+0.30579462811247926j
0.9158290821607151+0.3130442382619336j ]
fit1: [ 0.6306863503952125 -0.26508952180680806]
[ 0.6306863503952125 -0.26508952180680806  0.3693136496047875
-0.          ] 9.509367530355496e-10
[ 5.2477218655334046e-01 -2.8762354064936541e-01
2.5124291557673506e-01
-6.5851148225905029e-02  5.9991806867556420e-06]
9.987515378885186e-10

```


E_gs: -0.2876235406493654

test mps sampling took: (0.0013689994812011719, Counter({0: 5, 2: 5}))

truncated ham size: 10 Number of fitting points: 21

shots per matrix element: 250000.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.14840178828765588

1 Execution time: 0:01:04.380040 ovlp:

(0.9996160000000001+0.02204000000000006j)

2 Execution time: 0:01:04.382035 ovlp:

(0.9976959999999999+0.04738400000000009j)

3 Execution time: 0:01:04.384607 ovlp:

(0.9956719999999999+0.07132000000000005j)

4 Execution time: 0:01:04.388217 ovlp:

(0.991952+0.09809599999999996j)

5 Execution time: 0:01:04.392286 ovlp: (0.987544+0.12354400000000001j)

6 Execution time: 0:01:04.397265 ovlp: (0.982424+0.15174400000000001j)

7 Execution time: 0:01:04.403080 ovlp:

(0.975832+0.17370400000000008j)

8 Execution time: 0:01:04.410071 ovlp:

(0.9696400000000001+0.19342400000000004j)

9 Execution time: 0:01:04.417967 ovlp:

(0.9612480000000001+0.21730399999999994j)

10 Execution time: 0:01:04.426646 ovlp:

(0.952032+0.24243199999999998j)

11 Execution time: 0:01:04.436418 ovlp: (0.94248+0.266184j)

12 Execution time: 0:01:04.446480 ovlp:

(0.9314560000000001+0.29029600000000001j)

13 Execution time: 0:01:04.457441 ovlp:

(0.9201280000000001+0.30922399999999994j)

14 Execution time: 0:01:04.467813 ovlp:

(0.9066320000000001+0.33054399999999995j)

15 Execution time: 0:01:04.478341 ovlp:

(0.894768+0.34895999999999994j)

16 Execution time: 0:01:04.489540 ovlp:

(0.8806240000000001+0.37020800000000001j)

17 Execution time: 0:01:04.501251 ovlp:

(0.8633679999999999+0.38928800000000001j)

18 Execution time: 0:01:04.513538 ovlp: (0.850792+0.40951200000000001j)

19 Execution time: 0:01:04.526488 ovlp: (0.831712+0.42636800000000001j)

20 Execution time: 0:01:04.542590 ovlp:

(0.817456+0.44445599999999996j)

x_points = [np.float64(0.0), np.float64(0.14840178828765588),

np.float64(0.29680357657531176), np.float64(0.44520536486296763),

np.float64(0.5936071531506235), np.float64(0.7420089414382793),

np.float64(0.8904107297259353), np.float64(1.0388125180135912),

np.float64(1.187214306301247), np.float64(1.3356160945889028),

np.float64(1.4840178828765587), np.float64(1.6324196711642147),

```

np.float64(1.7808214594518705), np.float64(1.9292232477395264),
np.float64(2.0776250360271824), np.float64(2.2260268243148382),
np.float64(2.374428612602494), np.float64(2.52283040089015),
np.float64(2.6712321891778057), np.float64(2.8196339774654615),
np.float64(2.9680357657531173)] y_points = [1.          +0.j
0.9996160000000001+0.02204000000000006j
0.9976959999999999+0.04738400000000009j
0.9956719999999999+0.07132000000000005j
0.991952          +0.09809599999999996j
0.987544          +0.12354400000000001j
0.982424          +0.15174400000000001j
0.975832          +0.17370400000000008j
0.9696400000000001+0.19342400000000004j
0.9612480000000001+0.21730399999999994j
0.952032          +0.24243199999999998j
0.94248          +0.266184j
0.9314560000000001+0.29029600000000001j
0.9201280000000001+0.30922399999999994j
0.9066320000000001+0.33054399999999995j
0.894768          +0.34895999999999994j
0.8806240000000001+0.37020800000000001j
0.8633679999999999+0.38928800000000001j
0.850792          +0.40951200000000001j
0.831712          +0.42636800000000001j
0.817456          +0.44445599999999996j]
fit1: [ 0.6327918087160658 -0.26403870152028736]
[ 0.6327918087160658 -0.26403870152028736 0.3672081912839342
-0.          ] 4.5880103684490886e-10
[ 5.2011419348832588e-01 -2.8905070733172705e-01
3.4799443188835977e-01
-5.0533022631260555e-02 -3.9829529879989938e-07]
3.181481392968829e-10
E_gs: -0.28905070733172705
test mps sampling took: (0.001294851303100586, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.23850982143649851
1 Execution time: 0:01:04.881687 ovlp:
(0.9985215976345563+0.04295526872843003j)
2 Execution time: 0:01:04.883697 ovlp:
(0.9946623914598263+0.08270893233429177j)
3 Execution time: 0:01:04.886335 ovlp:
(0.9887871820594913+0.12198259517215226j)
4 Execution time: 0:01:04.889704 ovlp:
(0.9801759682815492+0.15999865599784968j)
5 Execution time: 0:01:04.893534 ovlp:

```

(0.9685599496959194+0.19491391186225893j)
6 Execution time: 0:01:04.897963 ovlp:
(0.9557535292056467+0.23533957654332238j)
7 Execution time: 0:01:04.903856 ovlp:
(0.9390399024638438+0.2725588360941378j)
8 Execution time: 0:01:04.910315 ovlp:
(0.9212702740324386+0.3098452957524731j)
9 Execution time: 0:01:04.917146 ovlp:
(0.9006398410237457+0.3387029419247072j)
10 Execution time: 0:01:04.925273 ovlp:
(0.8813726101961763+0.3721493954390327j)
11 Execution time: 0:01:04.933619 ovlp:
(0.8543485669577071+0.4009494415191064j)
12 Execution time: 0:01:04.942968 ovlp:
(0.8295997273595637+0.42771428434285497j)
13 Execution time: 0:01:04.953513 ovlp:
(0.8042652868244589+0.4580887329419727j)
14 Execution time: 0:01:04.963299 ovlp:
(0.7729116366586186+0.48477677564284094j)
15 Execution time: 0:01:04.973541 ovlp:
(0.7450043920070273+0.5056664090662546j)
16 Execution time: 0:01:04.984634 ovlp:
(0.7120571392914228+0.5255384408615054j)
17 Execution time: 0:01:04.996182 ovlp:
(0.6813178901086241+0.5428664685863498j)
18 Execution time: 0:01:05.010882 ovlp:
(0.6474586359338175+0.5600024960039935j)
19 Execution time: 0:01:05.024282 ovlp:
(0.6139641823426918+0.5733369173390677j)
20 Execution time: 0:01:05.037835 ovlp:
(0.5823801318082109+0.5878617405787849j)
21 Execution time: 0:01:05.054471 ovlp:
(0.5513432821492514+0.5961657538652061j)
22 Execution time: 0:01:05.069587 ovlp:
(0.5127416203865927+0.6016281626050601j)
23 Execution time: 0:01:05.085137 ovlp:
(0.48572717716348346+0.6049785679657087j)
24 Execution time: 0:01:05.101369 ovlp:
(0.44965031944051104+0.608962574340119j)
x_points = [np.float64(0.0), np.float64(0.23850982143649851),
np.float64(0.47701964287299703), np.float64(0.7155294643094956),
np.float64(0.9540392857459941), np.float64(1.1925491071824925),
np.float64(1.4310589286189912), np.float64(1.6695687500554897),
np.float64(1.9080785714919881), np.float64(2.1465883929284866),
np.float64(2.385098214364985), np.float64(2.6236080358014835),
np.float64(2.8621178572379824), np.float64(3.100627678674481),
np.float64(3.3391375001109793), np.float64(3.5776473215474778),

```

np.float64(3.8161571429839762), np.float64(4.054666964420475),
np.float64(4.293176785856973), np.float64(4.531686607293472),
np.float64(4.77019642872997), np.float64(5.008706250166469),
np.float64(5.247216071602967), np.float64(5.485725893039466),
np.float64(5.724235714475965)] y_points = [1.          +0.j
0.9985215976345563 +0.04295526872843003j
0.9946623914598263 +0.08270893233429177j
0.9887871820594913 +0.12198259517215226j
0.9801759682815492 +0.15999865599784968j
0.9685599496959194 +0.19491391186225893j
0.9557535292056467 +0.23533957654332238j
0.9390399024638438 +0.2725588360941378j
0.9212702740324386 +0.3098452957524731j
0.9006398410237457 +0.3387029419247072j
0.8813726101961763 +0.3721493954390327j
0.8543485669577071 +0.4009494415191064j
0.8295997273595637 +0.42771428434285497j
0.8042652868244589 +0.4580887329419727j
0.7729116366586186 +0.48477677564284094j
0.7450043920070273 +0.5056664090662546j
0.7120571392914228 +0.5255384408615054j
0.6813178901086241 +0.5428664685863498j
0.6474586359338175 +0.5600024960039935j
0.6139641823426918 +0.5733369173390677j
0.5823801318082109 +0.5878617405787849j
0.5513432821492514 +0.5961657538652061j
0.5127416203865927 +0.6016281626050601j
0.48572717716348346+0.6049785679657087j
0.44965031944051104+0.608962574340119j ]
fit1: [ 0.6210307748139787 -0.2591082327707519]
[ 0.41487404507196507 -0.31222773698376904  0.43544899798036224
-0.0854481025021427 ] 3.540909987629061e-09
[ 0.38921312788845386 -0.3250399778720082  0.38567476034118725
-0.0845950894025745 -0.04224790938065035] 6.40783140293921e-10
E_gs: -0.3250399778720082
test mps sampling took: (0.0012674331665039062, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.09456897278281857
1 Execution time: 0:01:05.733620 ovlp:
(0.9998119999999999+0.0165360000000000106j)
2 Execution time: 0:01:05.738133 ovlp:
(0.9992160000000000+0.03381199999999995j)
3 Execution time: 0:01:05.743094 ovlp:
(0.9982519999999999+0.0466400000000000015j)
4 Execution time: 0:01:05.747864 ovlp:

```

```

(0.99673600000000001+0.065636000000000003j)
5 Execution time: 0:01:05.753122  ovlp:
(0.9950159999999999+0.078040000000000011j)
6 Execution time: 0:01:05.758665  ovlp:
(0.99300000000000001+0.095596000000000001j)
7 Execution time: 0:01:05.764730  ovlp:
(0.990092+0.109939999999999993j)
8 Execution time: 0:01:05.771207  ovlp: (0.986964+0.128900000000000001j)
9 Execution time: 0:01:05.779462  ovlp:
(0.98423600000000001+0.140948000000000007j)
10 Execution time: 0:01:05.792205  ovlp:
(0.9800519999999999+0.15950400000000001j)
x_points = [np.float64(0.0), np.float64(0.09456897278281857),
np.float64(0.18913794556563715), np.float64(0.28370691834845574),
np.float64(0.3782758911312743), np.float64(0.47284486391409286),
np.float64(0.5674138366969115), np.float64(0.66198280947973),
np.float64(0.7565517822625486), np.float64(0.8511207550453672),
np.float64(0.9456897278281857)] y_points = [1.          +0.j
0.9998119999999999+0.0165360000000000011j
0.99921600000000001+0.033811999999999995j
0.9982519999999999+0.046640000000000001j
0.99673600000000001+0.065636000000000003j
0.9950159999999999+0.078040000000000011j
0.99300000000000001+0.095596000000000001j
0.990092          +0.109939999999999993j
0.986964          +0.128900000000000001j
0.98423600000000001+0.140948000000000007j
0.9800519999999999+0.15950400000000001j ]
fit1: [ 0.6223714165390054 -0.2713318588846466]
[ 0.6223714165390054 -0.2713318588846466  0.3776285834609946
-0.          ] 3.412400578821266e-11
[ 5.3978989105329900e-01 -2.6526471046997274e-01
3.1360644919538860e-01
-8.4330704057539480e-02  2.2031531874720557e-06]
7.51077566093993e-11
E_gs: -0.26526471046997274
test mps sampling took: (0.0015521049499511719, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.27936417430417376
1 Execution time: 0:01:06.359138  ovlp: (0.9984+0.04541599999999999j)
2 Execution time: 0:01:06.361684  ovlp:
(0.992944+0.09190399999999999j)
3 Execution time: 0:01:06.364408  ovlp:
(0.9843839999999999+0.139464000000000003j)
4 Execution time: 0:01:06.367670  ovlp: (0.971808+0.187095999999999993j)

```

```

5 Execution time: 0:01:06.371594  ovlp: (0.957176+0.22968799999999999j)
6 Execution time: 0:01:06.377080  ovlp: (0.93896+0.275368000000000006j)
7 Execution time: 0:01:06.383352  ovlp: (0.915856+0.315312000000000004j)
8 Execution time: 0:01:06.389945  ovlp:
(0.894544+0.352832000000000003j)
9 Execution time: 0:01:06.398464  ovlp:
(0.866616+0.389143999999999993j)
10 Execution time: 0:01:06.406600  ovlp:
(0.83647200000000001+0.424784000000000005j)
11 Execution time: 0:01:06.416492  ovlp: (0.806576+0.455136j)
12 Execution time: 0:01:06.426543  ovlp:
(0.772256+0.485168000000000004j)
13 Execution time: 0:01:06.437340  ovlp:
(0.73832000000000001+0.51122399999999999j)
14 Execution time: 0:01:06.447866  ovlp:
(0.702032+0.53252799999999999j)
15 Execution time: 0:01:06.460194  ovlp:
(0.66413600000000001+0.55535200000000001j)
16 Execution time: 0:01:06.474127  ovlp: (0.624152+0.57068800000000001j)
17 Execution time: 0:01:06.488052  ovlp: (0.584864+0.58201600000000001j)
18 Execution time: 0:01:06.505633  ovlp:
(0.54895999999999999+0.596984j)
19 Execution time: 0:01:06.521031  ovlp: (0.505992+0.603512j)
20 Execution time: 0:01:06.536654  ovlp:
(0.470984000000000007+0.60715199999999999j)
x_points = [np.float64(0.0), np.float64(0.27936417430417376),
np.float64(0.5587283486083475), np.float64(0.8380925229125213),
np.float64(1.117456697216695), np.float64(1.3968208715208688),
np.float64(1.6761850458250427), np.float64(1.9555492201292164),
np.float64(2.23491339443339), np.float64(2.514277568737564),
np.float64(2.7936417430417375), np.float64(3.0730059173459114),
np.float64(3.3523700916500854), np.float64(3.631734265954259),
np.float64(3.911098440258433), np.float64(4.190462614562606),
np.float64(4.46982678886678), np.float64(4.749190963170954),
np.float64(5.028555137475128), np.float64(5.307919311779301),
np.float64(5.587283486083475)] y_points = [1.          +0.j
0.9984          +0.04541599999999999j
0.992944        +0.09190399999999999j
0.9843839999999999 +0.139464000000000003j
0.971808        +0.18709599999999999j
0.957176        +0.22968799999999999j
0.93896         +0.275368000000000006j
0.915856        +0.315312000000000004j
0.894544        +0.352832000000000003j
0.866616        +0.389143999999999993j
0.83647200000000001 +0.424784000000000005j
0.806576        +0.455136j

```

```

0.772256      +0.4851680000000000004j
0.7383200000000000001 +0.511223999999999999j
0.702032      +0.532527999999999999j
0.6641360000000000001 +0.555352000000000000j
0.624152      +0.5706880000000000001j
0.584864      +0.5820160000000000001j
0.548959999999999999 +0.596984j
0.505992      +0.603512j
0.4709840000000000007 +0.607151999999999999j ]
fit1: [ 0.6227009610500007 -0.25901794625734453]
[ 0.4030758195343314 -0.31530068291337754 0.43880460417181144
-0.09094917752798483] 2.4610312659891338e-09
[ 0.37409996273764995 -0.33087153316954243 0.38599575243994233
-0.08771620021309455 -0.04830072612829547] 1.9344976336872035e-10
E_gs: -0.33087153316954243
test mps sampling took: (0.0013213157653808594, Counter({2: 8, 0: 2}))
truncated ham size: 10 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.14567652184462504
1 Execution time: 0:01:07.060775 ovlp:
(0.9995379995379996+0.023439023439023376j)
2 Execution time: 0:01:07.063155 ovlp:
(0.9982299982299982+0.046377046377046316j)
3 Execution time: 0:01:07.066165 ovlp:
(0.9956739956739957+0.07598707598707599j)
4 Execution time: 0:01:07.069564 ovlp:
(0.9927459927459927+0.10025710025710022j)
5 Execution time: 0:01:07.073477 ovlp:
(0.9881739881739882+0.12124512124512132j)
6 Execution time: 0:01:07.078292 ovlp:
(0.9832359832359832+0.14747714747714746j)
7 Execution time: 0:01:07.083545 ovlp:
(0.9767379767379767+0.17204717204717213j)
8 Execution time: 0:01:07.089746 ovlp:
(0.9701739701739702+0.19143919143919153j)
9 Execution time: 0:01:07.096218 ovlp:
(0.9621219621219621+0.21472521472521477j)
10 Execution time: 0:01:07.103406 ovlp:
(0.9540279540279539+0.24008724008724003j)
11 Execution time: 0:01:07.111667 ovlp:
(0.9442779442779443+0.26142326142326144j)
12 Execution time: 0:01:07.120918 ovlp:
(0.9325119325119324+0.2807132807132806j)
13 Execution time: 0:01:07.130291 ovlp:
(0.9227019227019226+0.3044313044313045j)
14 Execution time: 0:01:07.139847 ovlp:

```

```

(0.9102699102699103+0.32733332733332743j)
15 Execution time: 0:01:07.150801 ovlp:
(0.8992838992838992+0.347907347907348j)
x_points = [np.float64(0.0), np.float64(0.14567652184462504),
np.float64(0.2913530436892501), np.float64(0.4370295655338751),
np.float64(0.5827060873785002), np.float64(0.7283826092231251),
np.float64(0.8740591310677502), np.float64(1.0197356529123753),
np.float64(1.1654121747570003), np.float64(1.3110886966016253),
np.float64(1.4567652184462503), np.float64(1.6024417402908755),
np.float64(1.7481182621355005), np.float64(1.8937947839801255),
np.float64(2.0394713058247507), np.float64(2.1851478276693754)] y_points
= [1.          +0.j
0.9995379995379996+0.02343902343902338j
0.9982299982299982+0.04637704637704632j
0.9956739956739957+0.07598707598707599j
0.9927459927459927+0.10025710025710022j
0.9881739881739882+0.12124512124512132j
0.9832359832359832+0.14747714747714746j
0.9767379767379767+0.17204717204717213j
0.9701739701739702+0.19143919143919153j
0.9621219621219621+0.21472521472521477j
0.9540279540279539+0.24008724008724003j
0.9442779442779443+0.26142326142326144j
0.9325119325119324+0.2807132807132806j
0.9227019227019226+0.3044313044313045j
0.9102699102699103+0.32733332733332743j
0.8992838992838992+0.347907347907348j ]
fit1: [ 0.6366713231641533 -0.263976653567571 ]
[ 0.6366713231641533 -0.263976653567571  0.3633286768358467
-0.          ] 1.682583906031062e-10
[ 5.3119250147573260e-01 -2.8677249606083405e-01
3.1012313505901812e-01
-5.2485147352307103e-02  1.7662270895029527e-06]
1.5483379075761814e-10
E_gs: -0.28677249606083405
test mps sampling took: (0.0013568401336669922, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.024758187639083693
1 Execution time: 0:01:07.524793 ovlp:
(0.9999872000000001+0.0041535999999999795j)
2 Execution time: 0:01:07.527634 ovlp:
(0.9999359999999999+0.007692800000000055j)
3 Execution time: 0:01:07.530996 ovlp:
(0.9998975999999999+0.014553599999999944j)
4 Execution time: 0:01:07.535140 ovlp:

```



```

(0.9997183999999999+0.019731200000000006j)
5 Execution time: 0:01:07.540162  ovlp:
(0.9996544+0.021484800000000008j)
6 Execution time: 0:01:07.545720  ovlp:
(0.99942400000000001+0.0263552000000000023j)
7 Execution time: 0:01:07.551237  ovlp:
(0.9992319999999999+0.030963199999999997j)
8 Execution time: 0:01:07.557019  ovlp:
(0.9991104+0.0338815999999999956j)
9 Execution time: 0:01:07.564983  ovlp:
(0.9989568+0.037337600000000008j)
10 Execution time: 0:01:07.574023  ovlp: (0.9987328+0.0406784j)
11 Execution time: 0:01:07.584359  ovlp:
(0.9982975999999999+0.044358399999999991j)
12 Execution time: 0:01:07.593987  ovlp:
(0.99808000000000001+0.049548799999999995j)
13 Execution time: 0:01:07.603440  ovlp:
(0.99781760000000001+0.050323200000000001j)
14 Execution time: 0:01:07.614352  ovlp:
(0.9973631999999999+0.059039999999999998j)
15 Execution time: 0:01:07.625912  ovlp:
(0.9968512+0.066636799999999994j)
16 Execution time: 0:01:07.638460  ovlp:
(0.9965312+0.067116799999999998j)
x_points = [np.float64(0.0), np.float64(0.024758187639083693),
np.float64(0.049516375278167386), np.float64(0.07427456291725108),
np.float64(0.09903275055633477), np.float64(0.12379093819541846),
np.float64(0.14854912583450217), np.float64(0.17330731347358586),
np.float64(0.19806550111266955), np.float64(0.22282368875175323),
np.float64(0.24758187639083692), np.float64(0.2723400640299206),
np.float64(0.29709825166900433), np.float64(0.321856439308088),
np.float64(0.3466146269471717), np.float64(0.3713728145862554),
np.float64(0.3961310022253391)] y_points = [1.          +0.j
0.99998720000000001+0.004153599999999998j
0.9999359999999999+0.007692800000000006j
0.9998975999999999+0.014553599999999994j
0.9997183999999999+0.019731200000000006j
0.9996544          +0.021484800000000008j
0.99942400000000001+0.026355200000000002j
0.9992319999999999+0.030963199999999997j
0.9991104          +0.033881599999999996j
0.9989568          +0.037337600000000008j
0.9987328          +0.0406784j
0.9982975999999999+0.044358399999999991j
0.99808000000000001+0.049548799999999995j
0.99781760000000001+0.050323200000000001j
0.9973631999999999+0.059039999999999998j

```

```

0.9968512      +0.066636799999999994j
0.9965312      +0.067116799999999998j]
fit1: [ 0.5821317331264607 -0.29133856602927294]
[ 0.5821317331264607 -0.29133856602927294 0.4178682668735393
-0.          ] 3.1372459284502155e-10
[ 5.2086225082551141e-01 -2.5027082429193048e-01
3.8136554620624508e-01
-1.0097915309494512e-01 6.9459053783261472e-07]
3.209028936154141e-10
E_gs: -0.2502708242919305
test mps sampling took: (0.0013315677642822266, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1109409054003202
1 Execution time: 0:01:08.215914 ovlp:
(0.9997791999116801+0.01739160695664288j)
2 Execution time: 0:01:08.217909 ovlp:
(0.9989055995622398+0.03814441525776613j)
3 Execution time: 0:01:08.220493 ovlp:
(0.9974199989679995+0.05762762305104929j)
4 Execution time: 0:01:08.224113 ovlp:
(0.9955719982287994+0.07271642908657161j)
5 Execution time: 0:01:08.228116 ovlp:
(0.993294397317759+0.09184203673681468j)
6 Execution time: 0:01:08.233066 ovlp:
(0.9902511961004785+0.11164444465777779j)
x_points = [np.float64(0.0), np.float64(0.1109409054003202),
np.float64(0.2218818108006404), np.float64(0.3328227162009606),
np.float64(0.4437636216012808), np.float64(0.554704527001601),
np.float64(0.6656454324019212)] y_points = [1.          +0.j
0.9997791999116801+0.01739160695664288j
0.9989055995622398+0.03814441525776613j
0.9974199989679995+0.05762762305104929j
0.9955719982287994+0.07271642908657161j
0.993294397317759 +0.09184203673681468j
0.9902511961004785+0.11164444465777779j]
fit1: [ 0.5801377226311644 -0.29146057732104724]
[ 0.5801377226311644 -0.29146057732104724 0.41986227736883563
-0.          ] 2.0478256539270598e-11
[ 5.2199561284155904e-01 -2.5123662595249047e-01
3.8596268685983820e-01
-9.6100060082825359e-02 6.2098245562156596e-07]
2.2225606401856866e-11
E_gs: -0.25123662595249047
test mps sampling took: (0.0013885498046875, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 24

```

shots per matrix element: 217391.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.017396145524291046

1 Execution time: 0:01:08.797024 ovlp: (1+0.001577802208923007j)

2 Execution time: 0:01:08.798969 ovlp:
(0.9999631999484799+0.010271814380540034j)

3 Execution time: 0:01:08.802304 ovlp:
(0.9999355999098398+0.010014214019899548j)

4 Execution time: 0:01:08.805713 ovlp:
(0.9999263998969599+0.010915815282141361j)

5 Execution time: 0:01:08.810655 ovlp:
(0.9998067997295197+0.010593814831340698j)

6 Execution time: 0:01:08.815494 ovlp:
(0.9997607996651194+0.017576624607274383j)

7 Execution time: 0:01:08.822036 ovlp:
(0.9997331996264796+0.024430634202887935j)

8 Execution time: 0:01:08.828215 ovlp:
(0.9996227994719193+0.02526783537496957j)

9 Execution time: 0:01:08.834666 ovlp:
(0.9995307993431191+0.030235842330179175j)

10 Execution time: 0:01:08.841831 ovlp:
(0.9992179989051984+0.030806243128740363j)

11 Execution time: 0:01:08.849563 ovlp:
(0.9992179989051984+0.03382384735338628j)

12 Execution time: 0:01:08.858010 ovlp:
(0.9990983987377582+0.03504744906642876j)

13 Execution time: 0:01:08.866982 ovlp:
(0.9989235984930378+0.037191052067472974j)

14 Execution time: 0:01:08.877579 ovlp:
(0.9986475981066374+0.03946345524883732j)

15 Execution time: 0:01:08.889337 ovlp:
(0.9985463979649571+0.040171856240598824j)

16 Execution time: 0:01:08.902005 ovlp:
(0.9981231973724762+0.04948226927517707j)

17 Execution time: 0:01:08.913928 ovlp:
(0.9980495972694361+0.05338307473630466j)

18 Execution time: 0:01:08.926078 ovlp:
(0.9980679972951962+0.0542478759470264j)

19 Execution time: 0:01:08.939616 ovlp:
(0.9976447967027153+0.05754148055807273j)

20 Execution time: 0:01:08.954558 ovlp:
(0.997506796509515+0.05744948042927267j)

21 Execution time: 0:01:08.970740 ovlp:
(0.9971571960200745+0.05946428324999653j)

22 Execution time: 0:01:08.987955 ovlp:
(0.996945595723834+0.06608829252360948j)

23 Execution time: 0:01:09.003267 ovlp:

```

(0.9961175945646323+0.07137829992961997j)
x_points = [np.float64(0.0), np.float64(0.017396145524291046),
np.float64(0.03479229104858209), np.float64(0.05218843657287314),
np.float64(0.06958458209716419), np.float64(0.08698072762145523),
np.float64(0.10437687314574629), np.float64(0.12177301867003733),
np.float64(0.13916916419432837), np.float64(0.15656530971861943),
np.float64(0.17396145524291046), np.float64(0.1913576007672015),
np.float64(0.20875374629149257), np.float64(0.2261498918157836),
np.float64(0.24354603734007466), np.float64(0.2609421828643657),
np.float64(0.27833832838865674), np.float64(0.29573447391294777),
np.float64(0.31313061943723886), np.float64(0.3305267649615299),
np.float64(0.3479229104858209), np.float64(0.365319056010112),
np.float64(0.382715201534403), np.float64(0.40011134705869406)] y_points
= [1.          +0.j
1.          +0.00157780220892301j
0.9999631999484799+0.01027181438054003j
0.9999355999098398+0.01001421401989955j
0.9999263998969599+0.01091581528214136j
0.9998067997295197+0.0105938148313407j
0.9997607996651194+0.01757662460727438j
0.9997331996264796+0.02443063420288794j
0.9996227994719193+0.02526783537496957j
0.9995307993431191+0.03023584233017917j
0.9992179989051984+0.03080624312874036j
0.9992179989051984+0.03382384735338628j
0.9990983987377582+0.03504744906642876j
0.9989235984930378+0.03719105206747297j
0.9986475981066374+0.03946345524883732j
0.9985463979649571+0.04017185624059882j
0.9981231973724762+0.04948226927517707j
0.9980495972694361+0.05338307473630466j
0.9980679972951962+0.0542478759470264j
0.9976447967027153+0.05754148055807273j
0.997506796509515 +0.05744948042927267j
0.9971571960200745+0.05946428324999653j
0.996945595723834 +0.06608829252360948j
0.9961175945646323+0.07137829992961997j]
fit1: [ 0.5834949668131487 -0.292239013757334 ]
[ 0.5834949668131487 -0.292239013757334  0.4165050331868513
-0.          ] 8.444691764821916e-10
[ 5.0995007381613222e-01 -2.5806568195565704e-01
3.7191975475827715e-01
-1.0609531490573072e-01 1.1503131672008671e-06]
8.506038378858437e-10
E_gs: -0.25806568195565704
test mps sampling took: (0.0012769699096679688, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 5

```

shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.023367462646739154
1 Execution time: 0:01:09.626431 ovlp:
(0.9999904+0.0036624000000000656j)
2 Execution time: 0:01:09.628437 ovlp:
(0.9999343999999999+0.008675200000000105j)
3 Execution time: 0:01:09.631002 ovlp:
(0.9998959999999999+0.013073600000000019j)
4 Execution time: 0:01:09.634181 ovlp:
(0.9998047999999999+0.015424000000000104j)
x_points = [np.float64(0.0), np.float64(0.023367462646739154),
np.float64(0.04673492529347831), np.float64(0.07010238794021746),
np.float64(0.09346985058695662)] y_points = [1. +0.j
0.9999904 +0.00366240000000007j
0.9999343999999999+0.00867520000000011j
0.9998959999999999+0.01307360000000002j
0.9998047999999999+0.0154240000000001j]
fit1: [0.09133293528943152 -2.1812340299119586]
[0.09133293528943152 -2.1812340299119586 0.09134293518943153
-0.] 7.751111636865197e-11
[7.9025851743748779e-02 -1.8873023496087378e+00
7.9039314430499580e-02
-7.4397612554419212e-01 1.3456851630098418e-06]
1.4949356723973182e-10
E_gs: -1.8873023496087378
test mps sampling took: (0.0014142990112304688, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.10919761873979952
1 Execution time: 0:01:09.800852 ovlp:
(0.9997312+0.0158016000000000082j)
2 Execution time: 0:01:09.802787 ovlp:
(0.9990208+0.0378368000000000004j)
3 Execution time: 0:01:09.806315 ovlp:
(0.9975744+0.057452800000000008j)
4 Execution time: 0:01:09.809813 ovlp:
(0.9956351999999999+0.07176319999999992j)
5 Execution time: 0:01:09.814219 ovlp:
(0.993376+0.09325439999999996j)
6 Execution time: 0:01:09.819670 ovlp: (0.9902848+0.1062592j)
7 Execution time: 0:01:09.826454 ovlp:
(0.9879616+0.12983039999999999j)
8 Execution time: 0:01:09.833303 ovlp: (0.98336+0.14519679999999999j)
9 Execution time: 0:01:09.841651 ovlp:
(0.9786752000000001+0.16584960000000004j)

```

10 Execution time: 0:01:09.850258  ovlp:
(0.9733951999999999+0.18119039999999997j)
11 Execution time: 0:01:09.858578  ovlp: (0.9674560000000001+0.19872j)
12 Execution time: 0:01:09.868386  ovlp:
(0.962496+0.21794559999999996j)
13 Execution time: 0:01:09.879493  ovlp:
(0.9557696+0.23069439999999997j)
14 Execution time: 0:01:09.890341  ovlp:
(0.9502336+0.2471232000000001j)
15 Execution time: 0:01:09.902860  ovlp:
(0.9410879999999999+0.26858880000000007j)
16 Execution time: 0:01:09.915760  ovlp:
(0.9342528000000001+0.2838719999999999j)
x_points = [np.float64(0.0), np.float64(0.10919761873979952),
np.float64(0.21839523747959905), np.float64(0.3275928562193986),
np.float64(0.4367904749591981), np.float64(0.5459880936989976),
np.float64(0.6551857124387972), np.float64(0.7643833311785967),
np.float64(0.8735809499183962), np.float64(0.9827785686581957),
np.float64(1.0919761873979952), np.float64(1.2011738061377948),
np.float64(1.3103714248775944), np.float64(1.4195690436173938),
np.float64(1.5287666623571934), np.float64(1.6379642810969928),
np.float64(1.7471618998367924)] y_points = [1.          +0.j
0.9997312      +0.015801600000000008j
0.9990208      +0.0378368j
0.9975744      +0.057452800000000008j
0.9956351999999999+0.071763199999999992j
0.993376       +0.093254399999999996j
0.9902848      +0.1062592j
0.9879616      +0.12983039999999999j
0.98336        +0.14519679999999999j
0.9786752000000001+0.165849600000000004j
0.9733951999999999+0.18119039999999997j
0.9674560000000001+0.19872j
0.962496       +0.21794559999999996j
0.9557696      +0.23069439999999997j
0.9502336      +0.2471232000000001j
0.9410879999999999+0.26858880000000007j
0.9342528000000001+0.2838719999999999j ]
fit1: [ 0.639795544442902 -0.2623969515926196]
[ 0.639795544442902 -0.2623969515926196 0.360204455557098
-0.          ] 2.1895391091878706e-10
[ 5.2889198494914325e-01 -2.8601116617651384e-01
2.7686995916664275e-01
-6.1181082177220077e-02 2.9780430373079450e-06]
2.1883880796100774e-10
E_gs: -0.28601116617651384
test mps sampling took: (0.0013151168823242188, Counter({2: 5, 0: 5}))

```

truncated ham size: 10 Number of fitting points: 20

shots per matrix element: 263157.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.057570783890127215

1 Execution time: 0:01:10.325890 ovlp:

(0.9998859996123988+0.012612242881625768j)

2 Execution time: 0:01:10.327959 ovlp:

(0.9996655988630361+0.016632656551032188j)

3 Execution time: 0:01:10.330629 ovlp:

(0.9993387977519124+0.03142230683584324j)

4 Execution time: 0:01:10.334008 ovlp:

(0.9989435964082278+0.03740352717199236j)

5 Execution time: 0:01:10.337954 ovlp:

(0.9980087932298969+0.04848436484684049j)

6 Execution time: 0:01:10.342323 ovlp:

(0.997324790904289+0.057497995493184684j)

7 Execution time: 0:01:10.347370 ovlp:

(0.9964887880618793+0.069126035028519j)

8 Execution time: 0:01:10.353195 ovlp:

(0.9954399844959474+0.07801806526142196j)

9 Execution time: 0:01:10.359549 ovlp:

(0.9937983789144884+0.08300368221251953j)

10 Execution time: 0:01:10.366549 ovlp:

(0.9925899748059144+0.09929053758782791j)

11 Execution time: 0:01:10.374217 ovlp:

(0.9912219701546985+0.1029537500427502j)

12 Execution time: 0:01:10.382652 ovlp:

(0.9894511641339581+0.11445258913880307j)

13 Execution time: 0:01:10.391549 ovlp:

(0.9873079568470533+0.12680263112894585j)

14 Execution time: 0:01:10.401037 ovlp:

(0.9859703522991978+0.13615066291225397j)

15 Execution time: 0:01:10.411084 ovlp:

(0.9831507427125252+0.14498189293843589j)

16 Execution time: 0:01:10.421891 ovlp:

(0.9804603335651341+0.15608553069080444j)

17 Execution time: 0:01:10.435699 ovlp:

(0.9786971275702336+0.16159554942486798j)

18 Execution time: 0:01:10.450237 ovlp:

(0.9768351212394122+0.17297278810747962j)

19 Execution time: 0:01:10.465072 ovlp:

(0.9731415086811295+0.1833088232499991j)

x_points = [np.float64(0.0), np.float64(0.057570783890127215),

np.float64(0.11514156778025443), np.float64(0.17271235167038165),

np.float64(0.23028313556050886), np.float64(0.2878539194506361),

np.float64(0.3454247033407633), np.float64(0.4029954872308905),

np.float64(0.4605662711210177), np.float64(0.5181370550111449),

```

np.float64(0.5757078389012722), np.float64(0.6332786227913993),
np.float64(0.6908494066815266), np.float64(0.7484201905716538),
np.float64(0.805990974461781), np.float64(0.8635617583519082),
np.float64(0.9211325422420354), np.float64(0.9787033261321627),
np.float64(1.0362741100222899), np.float64(1.093844893912417)] y_points =
[1.          +0.j
 0.9998859996123988+0.01261224288162577j
 0.9996655988630361+0.01663265655103219j
 0.9993387977519124+0.03142230683584324j
 0.9989435964082278+0.03740352717199236j
 0.9980087932298969+0.04848436484684049j
 0.997324790904289 +0.05749799549318468j
 0.9964887880618793+0.069126035028519j
 0.9954399844959474+0.07801806526142196j
 0.9937983789144884+0.08300368221251953j
 0.9925899748059144+0.09929053758782791j
 0.9912219701546985+0.1029537500427502j
 0.9894511641339581+0.11445258913880307j
 0.9873079568470533+0.12680263112894585j
 0.9859703522991978+0.13615066291225397j
 0.9831507427125252+0.14498189293843589j
 0.9804603335651341+0.15608553069080444j
 0.9786971275702336+0.16159554942486798j
 0.9768351212394122+0.17297278810747962j
 0.9731415086811295+0.1833088232499991j ]
fit1: [ 0.6199593890314175 -0.27176413307613545]
[ 0.6199593890314175 -0.27176413307613545  0.38004061096858255
 -0.          ] 3.313331159901876e-10
[ 5.2494092659672420e-01 -2.6745990419455495e-01
 3.0786760563730403e-01
 -9.2275706445160879e-02  2.3264447416308704e-06]
5.2434073859885e-10
E_gs: -0.26745990419455495
test mps sampling took: (0.0013515949249267578, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.05892811634458403
1 Execution time: 0:01:11.025203  ovlp:
(0.9999423999999999+0.013132799999999945j)
2 Execution time: 0:01:11.027156  ovlp:
(0.999776+0.019846400000000042j)
3 Execution time: 0:01:11.030638  ovlp:
(0.9992703999999999+0.029158400000000003j)
4 Execution time: 0:01:11.033858  ovlp:
(0.9986816000000001+0.036243199999999992j)
5 Execution time: 0:01:11.037604  ovlp:

```



```

(0.9980992+0.047257600000000001j)
6 Execution time: 0:01:11.043652  ovlp:
(0.9972032+0.062489599999999992j)
7 Execution time: 0:01:11.049952  ovlp:
(0.99632640000000001+0.067833599999999994j)
8 Execution time: 0:01:11.055908  ovlp:
(0.99475200000000001+0.078284800000000004j)
9 Execution time: 0:01:11.062387  ovlp:
(0.9936448+0.089849599999999997j)
10 Execution time: 0:01:11.070622  ovlp: (0.9920127999999999+0.101248j)
11 Execution time: 0:01:11.079153  ovlp:
(0.9904192+0.107276799999999995j)
12 Execution time: 0:01:11.088941  ovlp:
(0.9889984+0.117343999999999989j)
13 Execution time: 0:01:11.099779  ovlp:
(0.98705280000000001+0.130483200000000002j)
14 Execution time: 0:01:11.111140  ovlp:
(0.9846784+0.138726399999999992j)
15 Execution time: 0:01:11.122841  ovlp:
(0.9831935999999999+0.148083200000000008j)
16 Execution time: 0:01:11.136508  ovlp:
(0.98024320000000001+0.159974400000000007j)
x_points = [np.float64(0.0), np.float64(0.05892811634458403),
np.float64(0.11785623268916806), np.float64(0.1767843490337521),
np.float64(0.23571246537833612), np.float64(0.2946405817229202),
np.float64(0.3535686980675042), np.float64(0.4124968144120882),
np.float64(0.47142493075667224), np.float64(0.5303530471012563),
np.float64(0.5892811634458404), np.float64(0.6482092797904243),
np.float64(0.7071373961350084), np.float64(0.7660655124795924),
np.float64(0.8249936288241764), np.float64(0.8839217451687604),
np.float64(0.9428498615133445)] y_points = [1.          +0.j
0.9999423999999999+0.013132799999999994j
0.999776          +0.019846400000000004j
0.9992703999999999+0.029158400000000003j
0.99868160000000001+0.036243199999999992j
0.9980992          +0.047257600000000001j
0.9972032          +0.062489599999999992j
0.99632640000000001+0.067833599999999994j
0.99475200000000001+0.078284800000000004j
0.9936448          +0.089849599999999997j
0.9920127999999999+0.101248j
0.9904192          +0.107276799999999995j
0.9889984          +0.117343999999999989j
0.98705280000000001+0.130483200000000002j
0.9846784          +0.138726399999999992j
0.9831935999999999+0.148083200000000008j
0.98024320000000001+0.159974400000000007j]

```

```

fit1: [ 0.6232362362240358 -0.2717494708977982]
[ 0.6232362362240358 -0.2717494708977982 0.3767637637759642
-0.          ] 2.290790957316244e-10
[ 5.4216258575568721e-01 -2.5566260564125809e-01
3.1975495446847796e-01
-9.8098512528647375e-02 1.8826371590138632e-06]
3.58246972260486e-10
E_gs: -0.2556626056412581
test mps sampling took: (0.0012536048889160156, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.22611752304913707
1 Execution time: 0:01:11.717103 ovlp:
(0.9989264+0.0382320000000000044j)
2 Execution time: 0:01:11.719073 ovlp: (0.9956144+0.07611999999999997j)
3 Execution time: 0:01:11.721763 ovlp:
(0.9895456+0.113233600000000005j)
4 Execution time: 0:01:11.725442 ovlp:
(0.98177920000000001+0.15150719999999995j)
x_points = [np.float64(0.0), np.float64(0.22611752304913707),
np.float64(0.45223504609827414), np.float64(0.6783525691474113),
np.float64(0.9044700921965483)] y_points = [1.          +0.j
0.9989264      +0.038232000000000004j
0.9956144      +0.07611999999999997j
0.9895456      +0.113233600000000005j
0.98177920000000001+0.15150719999999995j]
fit1: [ 0.5841688347748665 -0.29243791377006195]
[ 0.5841688347748665 -0.29243791377006195 0.4158311652251335
-0.          ] 2.8580276149533922e-11
[ 5.2094819256718194e-01 -2.5093746918855786e-01
3.7795094448801975e-01
-1.0168726261369146e-01 7.3520470983224852e-07]
7.252157939924608e-11
E_gs: -0.25093746918855786
test mps sampling took: (0.001276254653930664, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.08922884864411339
1 Execution time: 0:01:12.104893 ovlp:
(0.9997503996006394+0.010046416074265707j)
2 Execution time: 0:01:12.106850 ovlp:
(0.9993567989708783+0.029313646901835133j)
3 Execution time: 0:01:12.109392 ovlp:
(0.9983487973580758+0.04369446991115189j)
4 Execution time: 0:01:12.112569 ovlp:

```

(0.9974367958988735+0.05715369144590632j)
5 Execution time: 0:01:12.116851 ovlp:
(0.9956127929804688+0.07652652244243585j)
6 Execution time: 0:01:12.121569 ovlp:
(0.9935487896780635+0.09129134606615374j)
7 Execution time: 0:01:12.128345 ovlp:
(0.9911487858380574+0.10394416631066616j)
8 Execution time: 0:01:12.135187 ovlp:
(0.987903980646369+0.11831538930462293j)
9 Execution time: 0:01:12.141751 ovlp:
(0.9858303773286037+0.1317266107625772j)
10 Execution time: 0:01:12.150889 ovlp:
(0.9834111734578774+0.1464626343402149j)
11 Execution time: 0:01:12.160457 ovlp:
(0.9790527664844264+0.16027705644329027j)
12 Execution time: 0:01:12.170712 ovlp:
(0.9745119592191347+0.1755026808042892j)
13 Execution time: 0:01:12.180836 ovlp:
(0.9704703527525644+0.1971507154411447j)
14 Execution time: 0:01:12.192545 ovlp:
(0.9655263448421518+0.20738433181493088j)
15 Execution time: 0:01:12.203218 ovlp:
(0.9610527376843803+0.22218755550008873j)
16 Execution time: 0:01:12.216310 ovlp:
(0.9556191289906064+0.23220997153595446j)
17 Execution time: 0:01:12.228896 ovlp:
(0.9495231192369908+0.24974919959871933j)
18 Execution time: 0:01:12.244546 ovlp:
(0.9430719089150543+0.264494823191717j)
19 Execution time: 0:01:12.257613 ovlp:
(0.93747509996016+0.27660044256070804j)
20 Execution time: 0:01:12.273559 ovlp:
(0.9315422904676647+0.28621005793609267j)
21 Execution time: 0:01:12.288194 ovlp:
(0.9236318778110044+0.3014260822817316j)
22 Execution time: 0:01:12.303139 ovlp:
(0.916796666874667+0.31336850138960215j)
23 Execution time: 0:01:12.318682 ovlp:
(0.9096446554314488+0.32560852097363346j)
24 Execution time: 0:01:12.337197 ovlp:
(0.9008990414384663+0.33638933822294126j)
x_points = [np.float64(0.0), np.float64(0.08922884864411339),
np.float64(0.17845769728822677), np.float64(0.26768654593234015),
np.float64(0.35691539457645355), np.float64(0.44614424322056695),
np.float64(0.5353730918646803), np.float64(0.6246019405087937),
np.float64(0.7138307891529071), np.float64(0.8030596377970205),
np.float64(0.8922884864411339), np.float64(0.9815173350852473),

```

np.float64(1.0707461837293606), np.float64(1.159975032373474),
np.float64(1.2492038810175874), np.float64(1.338432729661701),
np.float64(1.4276615783058142), np.float64(1.5168904269499275),
np.float64(1.606119275594041), np.float64(1.6953481242381543),
np.float64(1.7845769728822678), np.float64(1.873805821526381),
np.float64(1.9630346701704946), np.float64(2.052263518814608),
np.float64(2.141492367458721)] y_points = [1.          +0.j
0.9997503996006394+0.01004641607426571j
0.9993567989708783+0.02931364690183513j
0.9983487973580758+0.04369446991115189j
0.9974367958988735+0.05715369144590632j
0.9956127929804688+0.07652652244243585j
0.9935487896780635+0.09129134606615374j
0.9911487858380574+0.10394416631066616j
0.987903980646369 +0.11831538930462293j
0.9858303773286037+0.1317266107625772j
0.9834111734578774+0.1464626343402149j
0.9790527664844264+0.16027705644329027j
0.9745119592191347+0.1755026808042892j
0.9704703527525644+0.1971507154411447j
0.9655263448421518+0.20738433181493088j
0.9610527376843803+0.22218755550008873j
0.9556191289906064+0.23220997153595446j
0.9495231192369908+0.24974919959871933j
0.9430719089150543+0.264494823191717j
0.93747509996016  +0.27660044256070804j
0.9315422904676647+0.28621005793609267j
0.9236318778110044+0.3014260822817316j
0.916796666874667 +0.31336850138960215j
0.9096446554314488+0.32560852097363346j
0.9008990414384663+0.33638933822294126j]
fit1: [ 0.6328805931176839 -0.2652950838782363]
[ 0.6328805931176839 -0.2652950838782363  0.36711940688231615
-0.          ] 1.0917405245553548e-09
[ 5.1545124558856381e-01 -2.8954295950453890e-01
2.9113213703667440e-01
-6.5432304609187295e-02  1.9304552956738208e-06]
9.818397998514945e-10
E_gs: -0.2895429595045389
test mps sampling took: (0.0013222694396972656, Counter({2: 8, 0: 2}))
truncated ham size: 10 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.11691195245051532
1 Execution time: 0:01:12.754003 ovlp:
(0.9997415994315189+0.01736383820044396j)
2 Execution time: 0:01:12.756007 ovlp:

```

```

(0.9988031973670342+0.0405382891842363j)
3 Execution time: 0:01:12.758580  ovlp:
(0.9968379930435847+0.0593947306684075j)
4 Execution time: 0:01:12.761875  ovlp:
(0.995423589931898+0.07937317462098425j)
5 Execution time: 0:01:12.765590  ovlp:
(0.9923363831400429+0.09763121478867243j)
6 Execution time: 0:01:12.769955  ovlp:
(0.989065575944267+0.11741925832236833j)
7 Execution time: 0:01:12.775000  ovlp:
(0.9847679664895264+0.13732970212534457j)
8 Execution time: 0:01:12.780635  ovlp:
(0.9806471574237463+0.15352053774518315j)
9 Execution time: 0:01:12.787105  ovlp:
(0.975628746383242+0.1710985764168682j)
10 Execution time: 0:01:12.794132  ovlp:
(0.9703247347144164+0.19519102942026478j)
11 Execution time: 0:01:12.801923  ovlp:
(0.9632663191859021+0.21370747015643432j)
12 Execution time: 0:01:12.810867  ovlp:
(0.957017105437632+0.2334071134956497j)
13 Execution time: 0:01:12.820278  ovlp:
(0.9494826888619154+0.2508695519130142j)
14 Execution time: 0:01:12.830062  ovlp:
(0.9419482722861989+0.26648918627620977j)
15 Execution time: 0:01:12.840468  ovlp:
(0.9328838523444751+0.28117041857492087j)
16 Execution time: 0:01:12.852334  ovlp:
(0.9234726316397897+0.2990816579796476j)
17 Execution time: 0:01:12.866390  ovlp:
(0.9141090110398242+0.31652369635213207j)
x_points = [np.float64(0.0), np.float64(0.11691195245051532),
np.float64(0.23382390490103064), np.float64(0.35073585735154594),
np.float64(0.4676478098020613), np.float64(0.5845597622525766),
np.float64(0.7014717147030919), np.float64(0.8183836671536072),
np.float64(0.9352956196041226), np.float64(1.0522075720546378),
np.float64(1.169119524505153), np.float64(1.2860314769556684),
np.float64(1.4029434294061838), np.float64(1.519855381856699),
np.float64(1.6367673343072144), np.float64(1.7536792867577298),
np.float64(1.870591239208245), np.float64(1.9875031916587604)] y_points =
[1.          +0.j
0.9997415994315189+0.01736383820044396j
0.9988031973670342+0.0405382891842363j
0.9968379930435847+0.0593947306684075j
0.995423589931898 +0.07937317462098425j
0.9923363831400429+0.09763121478867243j
0.989065575944267 +0.11741925832236833j

```

```

0.9847679664895264+0.13732970212534457j
0.9806471574237463+0.15352053774518315j
0.975628746383242 +0.1710985764168682j
0.9703247347144164+0.19519102942026478j
0.9632663191859021+0.21370747015643432j
0.957017105437632 +0.2334071134956497j
0.9494826888619154+0.2508695519130142j
0.9419482722861989+0.26648918627620977j
0.9328838523444751+0.28117041857492087j
0.9234726316397897+0.2990816579796476j
0.9141090110398242+0.31652369635213207j]
fit1: [ 0.6273559295762465 -0.2676503375296708]
[ 0.6273559295762465 -0.2676503375296708  0.37264407042375347
-0.          ] 2.3936861840155657e-10
[ 5.2652805965494809e-01 -2.8812254297423295e-01
3.3083354669243226e-01
-4.9793303702660656e-02  1.3215506551983792e-06]
2.163047324384008e-10
E_gs: -0.28812254297423295
test mps sampling took: (0.0013284683227539062, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1666520142742363
1 Execution time: 0:01:13.261027  ovlp:
(0.9994144+0.026838399999999993j)
2 Execution time: 0:01:13.262980  ovlp:
(0.99749439999999999+0.055702399999999993j)
3 Execution time: 0:01:13.265579  ovlp:
(0.9942336+0.082614399999999998j)
4 Execution time: 0:01:13.268792  ovlp:
(0.9902688+0.112454400000000007j)
5 Execution time: 0:01:13.272536  ovlp:
(0.9849824+0.138777600000000006j)
6 Execution time: 0:01:13.276969  ovlp:
(0.97788159999999999+0.165916799999999998j)
7 Execution time: 0:01:13.282011  ovlp: (0.97020480000000001+0.1940096j)
8 Execution time: 0:01:13.287652  ovlp: (0.96077759999999999+0.219792j)
x_points = [np.float64(0.0), np.float64(0.1666520142742363),
np.float64(0.3333040285484726), np.float64(0.4999560428227089),
np.float64(0.6666080570969452), np.float64(0.8332600713711814),
np.float64(0.9999120856454178), np.float64(1.166564099919654),
np.float64(1.3332161141938903)] y_points = [1.          +0.j
0.9994144      +0.026838399999999993j
0.99749439999999999+0.055702399999999993j
0.9942336      +0.082614399999999998j
0.9902688      +0.112454400000000007j

```

0.9849824 +0.13877760000000006j
0.9778815999999999+0.16591679999999998j
0.9702048000000001+0.1940096j
0.9607775999999999+0.219792j]
fit1: [0.6153749014561528 -0.27390108276136205]
[0.6153749014561528 -0.27390108276136205 0.3846250985438472
-0.] 8.808745048675646e-12
[5.0089890778565316e-01 -2.8701493709365883e-01
3.2596693435593238e-01
-7.5240191172779913e-02 1.6172966903038970e-06]
5.605906068293275e-12
E_gs: -0.28701493709365883
test mps sampling took: (0.001333475112915039, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.17683702975087498
1 Execution time: 0:01:13.902301 ovlp:
(0.9993195993195993+0.029387429387429442j)
2 Execution time: 0:01:13.904429 ovlp:
(0.9972615972615972+0.058594258594258486j)
3 Execution time: 0:01:13.907046 ovlp:
(0.9938175938175937+0.08913668913668915j)
4 Execution time: 0:01:13.910570 ovlp:
(0.9888363888363889+0.11975471975471974j)
5 Execution time: 0:01:13.914561 ovlp:
(0.9825615825615825+0.1420315420315421j)
6 Execution time: 0:01:13.919058 ovlp:
(0.9757071757071758+0.17647157647157652j)
7 Execution time: 0:01:13.924924 ovlp:
(0.9665007665007666+0.20220920220920213j)
8 Execution time: 0:01:13.931983 ovlp:
(0.9556983556983556+0.22951762951762955j)
9 Execution time: 0:01:13.939100 ovlp:
(0.9444423444423444+0.2580020580020581j)
10 Execution time: 0:01:13.946294 ovlp:
(0.9319431319431319+0.2853692853692853j)
11 Execution time: 0:01:13.954174 ovlp:
(0.9165123165123166+0.31258531258531264j)
12 Execution time: 0:01:13.962859 ovlp:
(0.9040719040719041+0.335088935088935j)
13 Execution time: 0:01:13.971955 ovlp:
(0.8877002877002877+0.36261576261576267j)
14 Execution time: 0:01:13.981958 ovlp:
(0.8706062706062707+0.38430458430458425j)
15 Execution time: 0:01:13.993603 ovlp:
(0.8541590541590542+0.4077994077994078j)

```

16 Execution time: 0:01:14.005131  ovlp:
(0.8350658350658351+0.4253218253218254j)
17 Execution time: 0:01:14.018821  ovlp:
(0.8129066129066129+0.4473130473130473j)
18 Execution time: 0:01:14.031790  ovlp:
(0.7918057918057919+0.4624582624582625j)
19 Execution time: 0:01:14.046510  ovlp:
(0.7697389697389698+0.4856170856170856j)
20 Execution time: 0:01:14.061412  ovlp:
(0.748982548982549+0.5015687015687016j)
21 Execution time: 0:01:14.075924  ovlp:
(0.727117327117327+0.5181755181755181j)
x_points = [np.float64(0.0), np.float64(0.17683702975087498),
np.float64(0.35367405950174996), np.float64(0.5305110892526249),
np.float64(0.7073481190034999), np.float64(0.8841851487543749),
np.float64(1.0610221785052498), np.float64(1.2378592082561248),
np.float64(1.4146962380069998), np.float64(1.5915332677578748),
np.float64(1.7683702975087499), np.float64(1.9452073272596249),
np.float64(2.1220443570104996), np.float64(2.2988813867613747),
np.float64(2.4757184165122497), np.float64(2.6525554462631247),
np.float64(2.8293924760139997), np.float64(3.0062295057648747),
np.float64(3.1830665355157497), np.float64(3.3599035652666247),
np.float64(3.5367405950174997), np.float64(3.7135776247683747)] y_points
= [1.          +0.j
0.9993195993195993+0.02938742938742944j
0.9972615972615972+0.05859425859425849j
0.9938175938175937+0.08913668913668915j
0.9888363888363889+0.11975471975471974j
0.9825615825615825+0.1420315420315421j
0.9757071757071758+0.17647157647157652j
0.9665007665007666+0.20220920220920213j
0.9556983556983556+0.22951762951762955j
0.9444423444423444+0.2580020580020581j
0.9319431319431319+0.2853692853692853j
0.9165123165123166+0.31258531258531264j
0.9040719040719041+0.335088935088935j
0.8877002877002877+0.36261576261576267j
0.8706062706062707+0.38430458430458425j
0.8541590541590542+0.4077994077994078j
0.8350658350658351+0.4253218253218254j
0.8129066129066129+0.4473130473130473j
0.7918057918057919+0.4624582624582625j
0.7697389697389698+0.4856170856170856j
0.748982548982549 +0.5015687015687016j
0.727117327117327 +0.5181755181755181j ]
fit1: [ 0.6294111479932564 -0.26289509166701963]
[ 0.575993812751891 -0.2750046667961438  0.3800999614600141

```



```

-0.02057050328280067] 1.0420174642132793e-09
[ 0.453044696634051 -0.30460606496669723 0.3622403519736314
-0.07553131421495199 -0.01115056055694559] 5.585595176786689e-10
E_gs: -0.30460606496669723
test mps sampling took: (0.0012884140014648438, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1719590173823105
1 Execution time: 0:01:14.453248 ovlp:
(0.9993711989939185+0.02743684389895029j)
2 Execution time: 0:01:14.455238 ovlp:
(0.997273595637753+0.058084892935828636j)
3 Execution time: 0:01:14.457760 ovlp:
(0.9941343906150251+0.08813294101270563j)
4 Execution time: 0:01:14.460895 ovlp:
(0.9892575828121326+0.11466258346013358j)
5 Execution time: 0:01:14.464751 ovlp:
(0.9835983737573981+0.1437122299395679j)
6 Execution time: 0:01:14.469339 ovlp:
(0.9767055627289003+0.17396187833900534j)
7 Execution time: 0:01:14.474446 ovlp:
(0.967993548789678+0.2012979220766753j)
8 Execution time: 0:01:14.480109 ovlp:
(0.9590847345355753+0.22646916235065984j)
9 Execution time: 0:01:14.486427 ovlp:
(0.9477423163877061+0.25249000398400634j)
10 Execution time: 0:01:14.493355 ovlp:
(0.935564696903515+0.27978764766023634j)
11 Execution time: 0:01:14.501005 ovlp:
(0.922259075614521+0.3021508834414135j)
12 Execution time: 0:01:14.509408 ovlp:
(0.9075566520906433+0.3292613268181228j)
x_points = [np.float64(0.0), np.float64(0.1719590173823105),
np.float64(0.343918034764621), np.float64(0.5158770521469316),
np.float64(0.687836069529242), np.float64(0.8597950869115525),
np.float64(1.0317541042938632), np.float64(1.2037131216761736),
np.float64(1.375672139058484), np.float64(1.5476311564407945),
np.float64(1.719590173823105), np.float64(1.8915491912054156),
np.float64(2.0635082085877263)] y_points = [1.          +0.j
0.9993711989939185+0.02743684389895029j
0.997273595637753 +0.05808489293582864j
0.9941343906150251+0.08813294101270563j
0.9892575828121326+0.11466258346013358j
0.9835983737573981+0.1437122299395679j
0.9767055627289003+0.17396187833900534j
0.967993548789678 +0.2012979220766753j

```

```

0.9590847345355753+0.22646916235065984j
0.9477423163877061+0.25249000398400634j
0.935564696903515 +0.27978764766023634j
0.922259075614521 +0.3021508834414135j
0.9075566520906433+0.3292613268181228j ]
fit1: [ 0.6280856020535975 -0.26786100588398787]
[ 0.6280856020535975 -0.26786100588398787 0.37191439794640246
-0.          ] 8.28915233393573e-11
[ 5.1949027844548068e-01 -2.8853357234534588e-01
3.2591114439120333e-01
-5.7092497205622622e-02 1.4802326955787822e-06]
5.738656412417326e-11
E_gs: -0.2885335723453459
test mps sampling took: (0.0017015933990478516, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.27185954025619524
1 Execution time: 0:01:15.007977 ovlp:
(0.9983147983147984+0.04532224532224527j)
2 Execution time: 0:01:15.010005 ovlp:
(0.9932371932371933+0.09238469238469249j)
3 Execution time: 0:01:15.012704 ovlp:
(0.9856911856911856+0.13514833514833513j)
4 Execution time: 0:01:15.015975 ovlp:
(0.9737759737759737+0.1823119823119823j)
5 Execution time: 0:01:15.019787 ovlp:
(0.9598323598323599+0.22363242363242364j)
6 Execution time: 0:01:15.024359 ovlp:
(0.9420563420563421+0.26415206415206405j)
7 Execution time: 0:01:15.029387 ovlp:
(0.9215831215831216+0.3087505087505087j)
8 Execution time: 0:01:15.035161 ovlp:
(0.8988350988350988+0.3424721424721424j)
9 Execution time: 0:01:15.041467 ovlp:
(0.8734514734514736+0.38025938025938033j)
10 Execution time: 0:01:15.048368 ovlp:
(0.8448602448602449+0.41424501424501425j)
11 Execution time: 0:01:15.057087 ovlp:
(0.8155562155562155+0.4466246466246466j)
x_points = [np.float64(0.0), np.float64(0.27185954025619524),
np.float64(0.5437190805123905), np.float64(0.8155786207685858),
np.float64(1.087438161024781), np.float64(1.3592977012809762),
np.float64(1.6311572415371716), np.float64(1.9030167817933668),
np.float64(2.174876322049562), np.float64(2.4467358623057573),
np.float64(2.7185954025619523), np.float64(2.9904549428181477)] y_points
= [1.          +0.j

```

```

0.9983147983147984+0.04532224532224527j
0.9932371932371933+0.09238469238469249j
0.9856911856911856+0.13514833514833513j
0.9737759737759737+0.1823119823119823j
0.9598323598323599+0.22363242363242364j
0.9420563420563421+0.26415206415206405j
0.9215831215831216+0.3087505087505087j
0.8988350988350988+0.3424721424721424j
0.8734514734514736+0.38025938025938033j
0.8448602448602449+0.41424501424501425j
0.8155562155562155+0.4466246466246466j ]
fit1: [ 0.6367648861469438 -0.26234347033535665]
[ 0.6367648861469438 -0.26234347033535665 0.3632351138530562
-0.          ] 2.862060264294628e-10
[ 5.325929331597112e-01 -2.843487214575404e-01
2.615206936161587e-01
-6.278913146264203e-02 1.740001035188821e-06]
1.2508383853031382e-10
E_gs: -0.2843487214575404
test mps sampling took: (0.0013508796691894531, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.009774078003853878
1 Execution time: 0:01:15.379805  ovlp:
(0.9999967999999999+0.0009984000000000066j)
2 Execution time: 0:01:15.382028  ovlp:
(0.9999967999999999+0.00173120000000000438j)
3 Execution time: 0:01:15.384932  ovlp:
(0.9999776+0.0037119999999999376j)
4 Execution time: 0:01:15.388722  ovlp:
(0.999952+0.0076704000000000077j)
5 Execution time: 0:01:15.393178  ovlp:
(0.9999583999999999+0.0075136000000000009j)
6 Execution time: 0:01:15.398913  ovlp:
(0.9999136+0.011507200000000005j)
7 Execution time: 0:01:15.404260  ovlp:
(0.99992640000000001+0.012710400000000001j)
8 Execution time: 0:01:15.411332  ovlp:
(0.99984000000000001+0.014073599999999908j)
x_points = [np.float64(0.0), np.float64(0.009774078003853878),
np.float64(0.019548156007707755), np.float64(0.029322234011561633),
np.float64(0.03909631201541551), np.float64(0.04887039001926939),
np.float64(0.058644468023123265), np.float64(0.06841854602697714),
np.float64(0.07819262403083102)] y_points = [1.          +0.j
0.9999967999999999+0.000998400000000007j
0.9999967999999999+0.001731200000000004j

```

0.9999776 +0.00371199999999994j
0.999952 +0.007670400000000008j
0.9999583999999999+0.007513600000000001j
0.9999136 +0.011507200000000005j
0.99992640000000001+0.012710400000000001j
0.99984000000000001+0.01407359999999991j]
fit1: [0.19659813419186165 -1.081667355158152]
[0.19659813419186165 -1.081667355158152 0.19660813409186165
-0.] 1.0230566606906299e-10
[1.6979310811541898e-01 -9.3426393620391002e-01
1.6979213945372176e-01
-3.7008565973139612e-01 1.3644963517575200e-06]
1.908124143895087e-10
E_gs: -0.93426393620391
test mps sampling took: (0.0012705326080322266, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.04909233452851251
1 Execution time: 0:01:15.579328 ovlp:
(0.9999423998387196+0.006591618456531778j)
2 Execution time: 0:01:15.581263 ovlp:
(0.9998199994959986+0.016383645874208375j)
3 Execution time: 0:01:15.583751 ovlp:
(0.9994455984476756+0.023108464703701204j)
4 Execution time: 0:01:15.587342 ovlp:
(0.9991719976815936+0.033548493935783075j)
5 Execution time: 0:01:15.591356 ovlp:
(0.9986247961494292+0.04192931740208872j)
6 Execution time: 0:01:15.596319 ovlp:
(0.9978903940931034+0.05068454191671745j)
7 Execution time: 0:01:15.601931 ovlp:
(0.9975591931657408+0.05753176108893099j)
8 Execution time: 0:01:15.607899 ovlp:
(0.9965223902626927+0.06882139269989951j)
9 Execution time: 0:01:15.614190 ovlp:
(0.9955719876015652+0.07394060703369965j)
10 Execution time: 0:01:15.621247 ovlp:
(0.9950607861702012+0.08355983396753519j)
11 Execution time: 0:01:15.628773 ovlp:
(0.9937791825817113+0.0890822494302983j)
12 Execution time: 0:01:15.637908 ovlp:
(0.9919071773400965+0.09891027694877552j)
13 Execution time: 0:01:15.648223 ovlp:
(0.9909567746789691+0.10680149904419722j)
14 Execution time: 0:01:15.658026 ovlp:
(0.9896823711106391+0.11729192841739966j)

```

15 Execution time: 0:01:15.668324  ovlp:
(0.9876591654456632+0.12383674674289091j)
16 Execution time: 0:01:15.680892  ovlp:
(0.9867519629054962+0.13115916724566823j)
17 Execution time: 0:01:15.692860  ovlp:
(0.9846711570792399+0.14128239559070765j)
18 Execution time: 0:01:15.707129  ovlp:
(0.9826767514949042+0.1449256057916961j)
x_points = [np.float64(0.0), np.float64(0.04909233452851251),
np.float64(0.09818466905702503), np.float64(0.14727700358553752),
np.float64(0.19636933811405005), np.float64(0.24546167264256258),
np.float64(0.29455400717107505), np.float64(0.3436463416995876),
np.float64(0.3927386762281001), np.float64(0.44183101075661263),
np.float64(0.49092334528512516), np.float64(0.5400156798136376),
np.float64(0.5891080143421501), np.float64(0.6382003488706627),
np.float64(0.6872926833991752), np.float64(0.7363850179276877),
np.float64(0.7854773524562002), np.float64(0.8345696869847127),
np.float64(0.8836620215132253)] y_points = [1.          +0.j
0.9999423998387196+0.00659161845653178j
0.9998199994959986+0.01638364587420837j
0.9994455984476756+0.0231084647037012j
0.9991719976815936+0.03354849393578307j
0.9986247961494292+0.04192931740208872j
0.9978903940931034+0.05068454191671745j
0.9975591931657408+0.05753176108893099j
0.9965223902626927+0.06882139269989951j
0.9955719876015652+0.07394060703369965j
0.9950607861702012+0.08355983396753519j
0.9937791825817113+0.0890822494302983j
0.9919071773400965+0.09891027694877552j
0.9909567746789691+0.10680149904419722j
0.9896823711106391+0.11729192841739966j
0.9876591654456632+0.12383674674289091j
0.9867519629054962+0.13115916724566823j
0.9846711570792399+0.14128239559070765j
0.9826767514949042+0.1449256057916961j ]
fit1: [ 0.6200611051341073 -0.27183573018537804]
[ 0.6200611051341073 -0.27183573018537804  0.3799388948658927
-0.          ] 8.473610391685238e-11
[ 5.3644721532717510e-01 -2.6164001034709605e-01
3.1857777165613355e-01
-8.9286564106317898e-02  2.1049689525794639e-06]
1.6786680867231806e-10
E_gs: -0.26164001034709605
test mps sampling took: (0.0013675689697265625, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 24
shots per matrix element: 217391.0

```

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.2100795828684076

1 Execution time: 0:01:16.262647 ovlp:

(0.999024798634718+0.033722647211706036j)

2 Execution time: 0:01:16.264708 ovlp:

(0.9959979943971922+0.07213270098578128j)

3 Execution time: 0:01:16.267290 ovlp:

(0.9906527869139017+0.10106674149343808j)

4 Execution time: 0:01:16.270395 ovlp:

(0.9839827775758887+0.14155599817839737j)

5 Execution time: 0:01:16.274344 ovlp:

(0.9765859672203541+0.17455644437902218j)

6 Execution time: 0:01:16.278744 ovlp:

(0.9650951511332115+0.20996729395421143j)

7 Execution time: 0:01:16.283773 ovlp:

(0.9525095335133469+0.2419925387895543j)

8 Execution time: 0:01:16.289499 ovlp:

(0.9389395145153203+0.27376018326425666j)

9 Execution time: 0:01:16.295901 ovlp:

(0.9230694922972893+0.30266662373327313j)

10 Execution time: 0:01:16.302816 ovlp:

(0.9051846672585342+0.3337350672290942j)

11 Execution time: 0:01:16.310466 ovlp:

(0.8851562392187349+0.36265070771099084j)

12 Execution time: 0:01:16.318624 ovlp:

(0.8656430119002168+0.3926611497256096j)

13 Execution time: 0:01:16.327543 ovlp:

(0.8423301792622511+0.4128367779714892j)

14 Execution time: 0:01:16.337798 ovlp:

(0.8192749469849259+0.4423596193034671j)

15 Execution time: 0:01:16.348611 ovlp:

(0.7967809154932817+0.46461445046023075j)

16 Execution time: 0:01:16.359761 ovlp:

(0.7686104760546664+0.48791808308531626j)

17 Execution time: 0:01:16.371562 ovlp:

(0.746493645091103+0.5061893086650322j)

18 Execution time: 0:01:16.383859 ovlp:

(0.7177160048024067+0.5245801344121881j)

19 Execution time: 0:01:16.396784 ovlp:

(0.6879631631484284+0.5379845531783745j)

20 Execution time: 0:01:16.413091 ovlp:

(0.6615223261312566+0.558178581450014j)

21 Execution time: 0:01:16.427479 ovlp:

(0.6337842872980022+0.5661457926041096j)

22 Execution time: 0:01:16.444542 ovlp:

(0.6050434470608259+0.5788326103656545j)

23 Execution time: 0:01:16.460331 ovlp:

```

(0.5721350009890014+0.590323426452797j)
x_points = [np.float64(0.0), np.float64(0.2100795828684076),
np.float64(0.4201591657368152), np.float64(0.6302387486052228),
np.float64(0.8403183314736304), np.float64(1.050397914342038),
np.float64(1.2604774972104456), np.float64(1.4705570800788532),
np.float64(1.6806366629472609), np.float64(1.8907162458156686),
np.float64(2.100795828684076), np.float64(2.310875411552484),
np.float64(2.520954994420891), np.float64(2.7310345772892988),
np.float64(2.9411141601577064), np.float64(3.151193743026114),
np.float64(3.3612733258945218), np.float64(3.5713529087629294),
np.float64(3.781432491631337), np.float64(3.9915120744997448),
np.float64(4.201591657368152), np.float64(4.41167124023656),
np.float64(4.621750823104968), np.float64(4.831830405973375)] y_points =
[1.          +0.j
 0.999024798634718 +0.03372264721170604j
 0.9959979943971922+0.07213270098578128j
 0.9906527869139017+0.10106674149343808j
 0.9839827775758887+0.14155599817839737j
 0.9765859672203541+0.17455644437902218j
 0.9650951511332115+0.20996729395421143j
 0.9525095335133469+0.2419925387895543j
 0.9389395145153203+0.27376018326425666j
 0.9230694922972893+0.30266662373327313j
 0.9051846672585342+0.3337350672290942j
 0.8851562392187349+0.36265070771099084j
 0.8656430119002168+0.3926611497256096j
 0.8423301792622511+0.4128367779714892j
 0.8192749469849259+0.4423596193034671j
 0.7967809154932817+0.46461445046023075j
 0.7686104760546664+0.48791808308531626j
 0.746493645091103 +0.5061893086650322j
 0.7177160048024067+0.5245801344121881j
 0.6879631631484284+0.5379845531783745j
 0.6615223261312566+0.558178581450014j
 0.6337842872980022+0.5661457926041096j
 0.6050434470608259+0.5788326103656545j
 0.5721350009890014+0.590323426452797j ]
fit1: [ 0.6267114991665289 -0.2609930342053755]
[ 0.4444390745561194 -0.3053092191871879  0.4059238576396643
 -0.07754906896573541] 1.7037328969190345e-09
[ 0.4552700691780996 -0.305433155944606  0.32546076650448036
 -0.05750850770640688 -0.04496075153223286] 1.1331845932318335e-09
E_gs: -0.305433155944606
test mps sampling took: (0.0012955665588378906, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80

```

```

N gate: 172 dt: 0.24574272850060705
1 Execution time: 0:01:17.061301 ovlp:
(0.9986447986447986+0.04234344234344234j)
2 Execution time: 0:01:17.063316 ovlp:
(0.9946935946935946+0.08044308044308046j)
3 Execution time: 0:01:17.065877 ovlp:
(0.9879307879307879+0.12201432201432194j)
4 Execution time: 0:01:17.069025 ovlp:
(0.9786687786687787+0.16445236445236455j)
5 Execution time: 0:01:17.072818 ovlp:
(0.9671363671363671+0.20361680361680357j)
6 Execution time: 0:01:17.077169 ovlp:
(0.952048752048752+0.24116644116644115j)
7 Execution time: 0:01:17.082068 ovlp:
(0.9349855349855349+0.28115808115808116j)
8 Execution time: 0:01:17.088477 ovlp:
(0.9158631158631159+0.31109131109131116j)
9 Execution time: 0:01:17.095457 ovlp:
(0.8959750959750961+0.34865854865854873j)
10 Execution time: 0:01:17.102855 ovlp:
(0.8718058718058719+0.3813989813989813j)
11 Execution time: 0:01:17.110435 ovlp:
(0.8465806465806467+0.41182501182501174j)
x_points = [np.float64(0.0), np.float64(0.24574272850060705),
np.float64(0.4914854570012141), np.float64(0.7372281855018211),
np.float64(0.9829709140024282), np.float64(1.2287136425030352),
np.float64(1.4744563710036422), np.float64(1.7201990995042493),
np.float64(1.9659418280048564), np.float64(2.2116845565054635),
np.float64(2.4574272850060703), np.float64(2.7031700135066776)] y_points
= [1.          +0.j
0.9986447986447986+0.04234344234344234j
0.9946935946935946+0.08044308044308046j
0.9879307879307879+0.12201432201432194j
0.9786687786687787+0.16445236445236455j
0.9671363671363671+0.20361680361680357j
0.952048752048752 +0.24116644116644115j
0.9349855349855349+0.28115808115808116j
0.9158631158631159+0.31109131109131116j
0.8959750959750961+0.34865854865854873j
0.8718058718058719+0.3813989813989813j
0.8465806465806467+0.41182501182501174j]
fit1: [ 0.6327484425546224 -0.2641660934316981]
[ 0.6327484425546224 -0.2641660934316981  0.36725155744537763
-0.          ] 1.6975948200928488e-10
[ 5.0261570120586518e-01 -2.9347057035687540e-01
3.1669924937404798e-01
-6.4264610229902791e-02  1.2441146578777696e-06]

```


1.0655351564693871e-10

E_gs: -0.2934705703568754

test mps sampling took: (0.0012383460998535156, Counter({0: 7, 2: 3}))

truncated ham size: 10 Number of fitting points: 22

shots per matrix element: 238095.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.298091580853687

1 Execution time: 0:01:17.446026 ovlp:

(0.9977403977403978+0.049303849303849345j)

2 Execution time: 0:01:17.447962 ovlp:

(0.9920367920367921+0.10136710136710136j)

3 Execution time: 0:01:17.450499 ovlp:

(0.9825783825783825+0.14644994644994647j)

4 Execution time: 0:01:17.453697 ovlp:

(0.9686931686931688+0.1989163989163989j)

5 Execution time: 0:01:17.457318 ovlp:

(0.9510195510195509+0.24619164619164624j)

6 Execution time: 0:01:17.461543 ovlp:

(0.9284907284907284+0.28694848694848685j)

7 Execution time: 0:01:17.467376 ovlp:

(0.9068523068523069+0.33174573174573174j)

8 Execution time: 0:01:17.474164 ovlp:

(0.8804090804090805+0.37372057372057377j)

9 Execution time: 0:01:17.480908 ovlp:

(0.8489342489342488+0.4099834099834099j)

10 Execution time: 0:01:17.487746 ovlp:

(0.8158214158214159+0.4440202440202441j)

11 Execution time: 0:01:17.495180 ovlp:

(0.7808353808353807+0.4791322791322792j)

12 Execution time: 0:01:17.503182 ovlp:

(0.745093345093345+0.5073227073227073j)

13 Execution time: 0:01:17.512011 ovlp:

(0.7072513072513074+0.5293811293811295j)

14 Execution time: 0:01:17.521253 ovlp:

(0.6654780654780654+0.5516915516915517j)

15 Execution time: 0:01:17.531253 ovlp:

(0.6261996261996261+0.5695079695079694j)

16 Execution time: 0:01:17.543660 ovlp:

(0.5826539826539827+0.5828891828891829j)

17 Execution time: 0:01:17.555289 ovlp:

(0.5425691425691426+0.5973203973203973j)

18 Execution time: 0:01:17.567205 ovlp:

(0.5020055020055021+0.6031248031248031j)

19 Execution time: 0:01:17.582357 ovlp:

(0.4618450618450618+0.6071484071484072j)

20 Execution time: 0:01:17.597283 ovlp:

(0.4173922173922173+0.607030807030807j)

```

21 Execution time: 0:01:17.613230 ovlp:
(0.38105378105378107+0.6044100044100045j)
x_points = [np.float64(0.0), np.float64(0.298091580853687),
np.float64(0.596183161707374), np.float64(0.8942747425610609),
np.float64(1.192366323414748), np.float64(1.490457904268435),
np.float64(1.7885494851221218), np.float64(2.086641065975809),
np.float64(2.384732646829496), np.float64(2.6828242276831826),
np.float64(2.98091580853687), np.float64(3.2790073893905567),
np.float64(3.5770989702442435), np.float64(3.8751905510979308),
np.float64(4.173282131951618), np.float64(4.471373712805304),
np.float64(4.769465293658992), np.float64(5.067556874512679),
np.float64(5.365648455366365), np.float64(5.6637400362200525),
np.float64(5.96183161707374), np.float64(6.259923197927426)] y_points =
[1.          +0.j
 0.9977403977403978 +0.04930384930384935j
 0.9920367920367921 +0.10136710136710136j
 0.9825783825783825 +0.14644994644994647j
 0.9686931686931688 +0.1989163989163989j
 0.9510195510195509 +0.24619164619164624j
 0.9284907284907284 +0.28694848694848685j
 0.9068523068523069 +0.33174573174573174j
 0.8804090804090805 +0.37372057372057377j
 0.8489342489342488 +0.4099834099834099j
 0.8158214158214159 +0.4440202440202441j
 0.7808353808353807 +0.4791322791322792j
 0.745093345093345  +0.5073227073227073j
 0.7072513072513074 +0.5293811293811295j
 0.6654780654780654 +0.5516915516915517j
 0.6261996261996261 +0.5695079695079694j
 0.5826539826539827 +0.5828891828891829j
 0.5425691425691426 +0.5973203973203973j
 0.5020055020055021 +0.6031248031248031j
 0.4618450618450618 +0.6071484071484072j
 0.4173922173922173 +0.607030807030807j
 0.38105378105378107+0.6044100044100045j ]
fit1: [ 0.6170281125053002 -0.25785994731531436]
[ 0.4029659669462857 -0.31461074482137064 0.44284140899346947
-0.08933637498018998] 6.3463686910087216e-09
[ 0.3966598935131984 -0.32176469418131953 0.34479935291880043
-0.08227398989092118 -0.04686648356162797] 5.661426159147177e-10
E_gs: -0.32176469418131953
test mps sampling took: (0.0013172626495361328, Counter({2: 8, 0: 2}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.11434598881708961
1 Execution time: 0:01:18.170246 ovlp:

```

```

(0.9997551993145581+0.016369245833888435j)
2 Execution time: 0:01:18.172245  ovlp:
(0.9989343970163116+0.04014371240239467j)
3 Execution time: 0:01:18.174800  ovlp:
(0.997213592198058+0.060548569535994634j)
4 Execution time: 0:01:18.178570  ovlp:
(0.9956151877225257+0.0770582157630042j)
5 Execution time: 0:01:18.182527  ovlp:
(0.9926127793157822+0.09677187096123863j)
6 Execution time: 0:01:18.187561  ovlp:
(0.9890487693365542+0.1131087167044067j)
7 Execution time: 0:01:18.193089  ovlp:
(0.9856143597202072+0.13705598375675443j)
8 Execution time: 0:01:18.199894  ovlp:
(0.9811071471000119+0.1541992317578489j)
9 Execution time: 0:01:18.206737  ovlp:
(0.9765063342177358+0.16824647109011903j)
10 Execution time: 0:01:18.214110  ovlp:
(0.9713583198032953+0.18902572927204186j)
11 Execution time: 0:01:18.222458  ovlp:
(0.9653175028890082+0.20861698412755558j)
12 Execution time: 0:01:18.231550  ovlp:
(0.9594926865795224+0.22702743567681982j)
13 Execution time: 0:01:18.242667  ovlp:
(0.951011062830976+0.24300428041198519j)
14 Execution time: 0:01:18.253359  ovlp:
(0.9435590419653175+0.2582251230303445j)
15 Execution time: 0:01:18.264909  ovlp:
(0.936481422147982+0.2783275793172222j)
16 Execution time: 0:01:18.276931  ovlp:
(0.926415793964223+0.29407402340726563j)
17 Execution time: 0:01:18.288600  ovlp:
(0.9171637680585505+0.3142700799562239j)
18 Execution time: 0:01:18.302814  ovlp:
(0.9077533417093568+0.3278709180385706j)
x_points = [np.float64(0.0), np.float64(0.11434598881708961),
np.float64(0.22869197763417923), np.float64(0.3430379664512688),
np.float64(0.45738395526835846), np.float64(0.5717299440854481),
np.float64(0.6860759329025377), np.float64(0.8004219217196273),
np.float64(0.9147679105367169), np.float64(1.0291138993538065),
np.float64(1.1434598881708962), np.float64(1.2578058769879858),
np.float64(1.3721518658050753), np.float64(1.486497854622165),
np.float64(1.6008438434392547), np.float64(1.7151898322563441),
np.float64(1.8295358210734338), np.float64(1.9438818098905235),
np.float64(2.058227798707613)] y_points = [1.          +0.j
0.9997551993145581+0.01636924583388844j
0.9989343970163116+0.04014371240239467j

```

0.997213592198058 +0.06054856953599463j
 0.9956151877225257+0.0770582157630042j
 0.9926127793157822+0.09677187096123863j
 0.9890487693365542+0.1131087167044067j
 0.9856143597202072+0.13705598375675443j
 0.9811071471000119+0.1541992317578489j
 0.9765063342177358+0.16824647109011903j
 0.9713583198032953+0.18902572927204186j
 0.9653175028890082+0.20861698412755558j
 0.9594926865795224+0.22702743567681982j
 0.951011062830976 +0.24300428041198519j
 0.9435590419653175+0.2582251230303445j
 0.936481422147982 +0.2783275793172222j
 0.926415793964223 +0.29407402340726563j
 0.9171637680585505+0.3142700799562239j
 0.9077533417093568+0.3278709180385706j]
 fit1: [0.6305891225100303 -0.2667442664734365]
 [0.6305891225100303 -0.2667442664734365 0.3694108774899697
 -0.] 2.369446970095917e-10
 [4.9817643537037110e-01 -2.9444680062756345e-01
 2.9743190645483680e-01
 -7.3507536163420636e-02 2.6095272314584790e-06]
 2.2463580262447993e-10
 E_gs: -0.29444680062756345
 test mps sampling took: (0.0013394355773925781, Counter({2: 5, 0: 5}))
 truncated ham size: 10 Number of fitting points: 17
 shots per matrix element: 312500.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.28779162137440867
 1 Execution time: 0:01:18.671037 ovlp:
 (0.9981055999999999+0.04807040000000007j)
 2 Execution time: 0:01:18.673030 ovlp:
 (0.9924928+0.09445759999999992j)
 3 Execution time: 0:01:18.675638 ovlp:
 (0.9841983999999999+0.14250239999999992j)
 4 Execution time: 0:01:18.678749 ovlp:
 (0.9712255999999999+0.19022720000000004j)
 5 Execution time: 0:01:18.682549 ovlp:
 (0.9552064+0.23424639999999997j)
 6 Execution time: 0:01:18.686841 ovlp: (0.9350912+0.28036480000000001j)
 7 Execution time: 0:01:18.691800 ovlp: (0.9136384+0.32145280000000001j)
 8 Execution time: 0:01:18.697435 ovlp:
 (0.8864255999999999+0.36032639999999994j)
 9 Execution time: 0:01:18.703536 ovlp:
 (0.85898880000000001+0.39899520000000001j)
 10 Execution time: 0:01:18.711233 ovlp:
 (0.8293504+0.43439999999999999j)

```

11 Execution time: 0:01:18.720047  ovlp: (0.7978368+0.4645888j)
12 Execution time: 0:01:18.728312  ovlp:
(0.7622528+0.49392640000000001j)
13 Execution time: 0:01:18.737096  ovlp: (0.7248128+0.5185088j)
14 Execution time: 0:01:18.746401  ovlp: (0.6847744+0.5442752j)
15 Execution time: 0:01:18.756317  ovlp: (0.64419840000000001+0.562432j)
16 Execution time: 0:01:18.768606  ovlp:
(0.60728960000000001+0.57812480000000001j)
x_points = [np.float64(0.0), np.float64(0.28779162137440867),
np.float64(0.5755832427488173), np.float64(0.863374864123226),
np.float64(1.1511664854976347), np.float64(1.4389581068720434),
np.float64(1.726749728246452), np.float64(2.0145413496208606),
np.float64(2.3023329709952693), np.float64(2.590124592369678),
np.float64(2.877916213744087), np.float64(3.1657078351184955),
np.float64(3.453499456492904), np.float64(3.7412910778673125),
np.float64(4.029082699241721), np.float64(4.31687432061613),
np.float64(4.604665941990539)] y_points = [1.          +0.j
0.9981055999999999+0.048070400000000007j
0.9924928          +0.094457599999999992j
0.9841983999999999+0.14250239999999992j
0.9712255999999999+0.190227200000000004j
0.9552064          +0.234246399999999997j
0.9350912          +0.280364800000000001j
0.9136384          +0.321452800000000001j
0.8864255999999999+0.360326399999999994j
0.85898880000000001+0.39899520000000001j
0.8293504          +0.43439999999999999j
0.7978368          +0.4645888j
0.7622528          +0.49392640000000001j
0.7248128          +0.5185088j
0.6847744          +0.5442752j
0.64419840000000001+0.562432j
0.60728960000000001+0.57812480000000001j ]
fit1: [ 0.6279118951207588 -0.26049998980048145]
[ 0.5040146049425687 -0.2897377003976592  0.38181023641478784
-0.05254245741691738] 1.0177123952002094e-09
[ 0.502920749042485 -0.29069830768600946  0.32946148319386886
-0.05060658191598735 -0.02014876395915793] 8.005482175816852e-10
E_gs: -0.29069830768600946
test mps sampling took: (0.0013210773468017578, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2821250657472018
1 Execution time: 0:01:19.213529  ovlp:
(0.9980511980511981+0.04948024948024954j)
2 Execution time: 0:01:19.215484  ovlp:

```

(0.992927192927193+0.09845229845229841j)
3 Execution time: 0:01:19.218007 ovlp:
(0.9841491841491841+0.14473634473634478j)
4 Execution time: 0:01:19.221155 ovlp:
(0.9725991725991725+0.18455238455238465j)
5 Execution time: 0:01:19.224964 ovlp:
(0.9557823557823557+0.22931602931602924j)
6 Execution time: 0:01:19.229386 ovlp:
(0.9368907368907369+0.2786744786744786j)
7 Execution time: 0:01:19.234334 ovlp:
(0.9166971166971167+0.31979251979251977j)
8 Execution time: 0:01:19.240062 ovlp:
(0.8916482916482917+0.3534093534093534j)
9 Execution time: 0:01:19.246177 ovlp:
(0.8637098637098637+0.3899745899745899j)
10 Execution time: 0:01:19.252926 ovlp:
(0.8369642369642369+0.42269262269262264j)
11 Execution time: 0:01:19.260372 ovlp:
(0.8033558033558033+0.45664545664545675j)
12 Execution time: 0:01:19.269172 ovlp:
(0.7669417669417669+0.4885738885738886j)
13 Execution time: 0:01:19.280322 ovlp:
(0.7324597324597324+0.5127995127995129j)
14 Execution time: 0:01:19.289928 ovlp:
(0.6965328965328965+0.5385287385287385j)
15 Execution time: 0:01:19.300523 ovlp:
(0.6567252567252568+0.5600495600495601j)
16 Execution time: 0:01:19.314714 ovlp:
(0.6182196182196182+0.5692727692727693j)
17 Execution time: 0:01:19.328404 ovlp:
(0.5768663768663769+0.5903651903651903j)
18 Execution time: 0:01:19.343512 ovlp:
(0.5417375417375416+0.5968331968331968j)
19 Execution time: 0:01:19.357300 ovlp:
(0.5006279006279006+0.6057456057456057j)
20 Execution time: 0:01:19.372652 ovlp:
(0.4646086646086647+0.6082824082824083j)
21 Execution time: 0:01:19.387229 ovlp:
(0.4244482244482244+0.6113064113064113j)
x_points = [np.float64(0.0), np.float64(0.2821250657472018),
np.float64(0.5642501314944036), np.float64(0.8463751972416054),
np.float64(1.1285002629888072), np.float64(1.410625328736009),
np.float64(1.6927503944832107), np.float64(1.9748754602304126),
np.float64(2.2570005259776145), np.float64(2.539125591724816),
np.float64(2.821250657472018), np.float64(3.10337572321922),
np.float64(3.3855007889664215), np.float64(3.6676258547136236),
np.float64(3.949750920460825), np.float64(4.231875986208027),

```

np.float64(4.514001051955229), np.float64(4.796126117702431),
np.float64(5.078251183449632), np.float64(5.360376249196834),
np.float64(5.642501314944036), np.float64(5.924626380691238)] y_points =
[1.          +0.j
 0.9980511980511981+0.04948024948024954j
 0.992927192927193 +0.09845229845229841j
 0.9841491841491841+0.14473634473634478j
 0.9725991725991725+0.18455238455238465j
 0.9557823557823557+0.22931602931602924j
 0.9368907368907369+0.2786744786744786j
 0.9166971166971167+0.31979251979251977j
 0.8916482916482917+0.3534093534093534j
 0.8637098637098637+0.3899745899745899j
 0.8369642369642369+0.42269262269262264j
 0.8033558033558033+0.45664545664545675j
 0.7669417669417669+0.4885738885738886j
 0.7324597324597324+0.5127995127995129j
 0.6965328965328965+0.5385287385287385j
 0.6567252567252568+0.5600495600495601j
 0.6182196182196182+0.5692727692727693j
 0.5768663768663769+0.5903651903651903j
 0.5417375417375416+0.5968331968331968j
 0.5006279006279006+0.6057456057456057j
 0.4646086646086647+0.6082824082824083j
 0.4244482244482244+0.6113064113064113j ]
fit1: [ 0.6217218278950327 -0.2578143057924834]
[ 0.3918046128557611 -0.32423192522493494  0.5819594126878391
 -0.07158318806862558] 1.7677717275114065e-09
[ 0.3679578431977741 -0.3301332450170104  0.36830745198443093
 -0.10159305098598692 -0.0374468340911293 ] 1.6296693914253821e-09
E_gs: -0.3301332450170104
test mps sampling took: (0.0012912750244140625, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.11500177331158719
1 Execution time: 0:01:19.735283 ovlp:
(0.9997111990180767+0.02002226807571139j)
2 Execution time: 0:01:19.737231 ovlp:
(0.9989131963048674+0.040922339135953j)
3 Execution time: 0:01:19.739762 ovlp:
(0.9973171908784491+0.059466402185767375j)
4 Execution time: 0:01:19.742908 ovlp:
(0.9950675832297831+0.07525925588146998j)
5 Execution time: 0:01:19.746643 ovlp:
(0.9928711757619977+0.09611372678667118j)
6 Execution time: 0:01:19.750934 ovlp:

```

```

(0.9894283640564379+0.11696059766603217j)
7 Execution time: 0:01:19.755772 ovlp:
(0.9858259518082362+0.1356566612326482j)
8 Execution time: 0:01:19.761226 ovlp:
(0.9819879387589918+0.154329924721744j)
9 Execution time: 0:01:19.767291 ovlp:
(0.976728720877651+0.17242558624699322j)
10 Execution time: 0:01:19.773907 ovlp:
(0.9701090983709344+0.19018684663527852j)
11 Execution time: 0:01:19.781270 ovlp:
(0.9647890802828729+0.20699810379355288j)
12 Execution time: 0:01:19.789198 ovlp:
(0.9582682581120776+0.22925857947917017j)
13 Execution time: 0:01:19.797884 ovlp:
(0.9516334355536809+0.24497543291647195j)
14 Execution time: 0:01:19.807151 ovlp:
(0.9430606064060618+0.2631242946226018j)
15 Execution time: 0:01:19.818948 ovlp:
(0.9344421771034022+0.279494750282151j)
16 Execution time: 0:01:19.829975 ovlp:
(0.9251473455009747+0.2978032125309227j)
17 Execution time: 0:01:19.841295 ovlp:
(0.9174789194283262+0.31326926511550135j)
18 Execution time: 0:01:19.853335 ovlp:
(0.9084880888595022+0.3317525279585951j)
19 Execution time: 0:01:19.865862 ovlp:
(0.8996264587299596+0.3450981733337892j)
x_points = [np.float64(0.0), np.float64(0.11500177331158719),
np.float64(0.23000354662317438), np.float64(0.3450053199347616),
np.float64(0.46000709324634875), np.float64(0.5750088665579359),
np.float64(0.6900106398695232), np.float64(0.8050124131811103),
np.float64(0.9200141864926975), np.float64(1.0350159598042847),
np.float64(1.1500177331158719), np.float64(1.265019506427459),
np.float64(1.3800212797390463), np.float64(1.4950230530506334),
np.float64(1.6100248263622206), np.float64(1.725026599673808),
np.float64(1.840028372985395), np.float64(1.9550301462969821),
np.float64(2.0700319196085695), np.float64(2.1850336929201566)] y_points
= [1.          +0.j
0.9997111990180767+0.02002226807571139j
0.9989131963048674+0.040922339135953j
0.9973171908784491+0.05946640218576738j
0.9950675832297831+0.07525925588146998j
0.9928711757619977+0.09611372678667118j
0.9894283640564379+0.11696059766603217j
0.9858259518082362+0.1356566612326482j
0.9819879387589918+0.154329924721744j
0.976728720877651 +0.17242558624699322j

```


0.9701090983709344+0.19018684663527852j
 0.9647890802828729+0.20699810379355288j
 0.9582682581120776+0.22925857947917017j
 0.9516334355536809+0.24497543291647195j
 0.9430606064060618+0.2631242946226018j
 0.9344421771034022+0.279494750282151j
 0.9251473455009747+0.2978032125309227j
 0.9174789194283262+0.31326926511550135j
 0.9084880888595022+0.3317525279585951j
 0.8996264587299596+0.3450981733337892j]
 fit1: [0.6337087380974528 -0.2648056864302976]
 [0.6337087380974528 -0.2648056864302976 0.36629126190254724
 -0.] 1.297876802993627e-10
 [5.2264275754144951e-01 -2.8581499454890175e-01
 3.0749360328473679e-01
 -6.2137443324379045e-02 1.5872211164608196e-06]
 8.264821330395017e-11
 E_gs: -0.28581499454890175
 test mps sampling took: (0.001318216323852539, Counter({2: 6, 0: 4}))
 truncated ham size: 10 Number of fitting points: 19
 shots per matrix element: 277777.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.11817848068317244
 1 Execution time: 0:01:20.242549 ovlp:
 (0.9996327989718372+0.019803655450235214j)
 2 Execution time: 0:01:20.244921 ovlp:
 (0.9988695968348711+0.039560510769430124j)
 3 Execution time: 0:01:20.247499 ovlp:
 (0.9969039913311757+0.05917336568542386j)
 4 Execution time: 0:01:20.251080 ovlp:
 (0.9949599858879605+0.0787214204199771j)
 5 Execution time: 0:01:20.254961 ovlp:
 (0.9919935775820172+0.10103428289599203j)
 6 Execution time: 0:01:20.259556 ovlp:
 (0.988775168570472+0.11590232452650873j)
 7 Execution time: 0:01:20.265027 ovlp:
 (0.9849807579461223+0.14001519204253765j)
 8 Execution time: 0:01:20.271594 ovlp:
 (0.9795519427454398+0.1615576523614266j)
 9 Execution time: 0:01:20.278038 ovlp:
 (0.9750159300446042+0.1749568898792917j)
 10 Execution time: 0:01:20.286286 ovlp:
 (0.9693135140778395+0.19300734042055323j)
 11 Execution time: 0:01:20.294049 ovlp:
 (0.9628550959942688+0.21420419977175942j)
 12 Execution time: 0:01:20.302871 ovlp:
 (0.9552086745842889+0.23524985869960435j)

```

13 Execution time: 0:01:20.313281 ovlp:
(0.9490166572466403+0.25307710861590405j)
14 Execution time: 0:01:20.323544 ovlp:
(0.9408734344456164+0.26583554433952417j)
15 Execution time: 0:01:20.333524 ovlp:
(0.9307214060199369+0.28563559977967934j)
16 Execution time: 0:01:20.344046 ovlp:
(0.9221533820294696+0.30288684808317456j)
17 Execution time: 0:01:20.356700 ovlp:
(0.9126565554383552+0.32061329771723357j)
18 Execution time: 0:01:20.370773 ovlp:
(0.9041965317502889+0.33797974634328987j)
x_points = [np.float64(0.0), np.float64(0.11817848068317244),
np.float64(0.23635696136634488), np.float64(0.3545354420495173),
np.float64(0.47271392273268975), np.float64(0.5908924034158622),
np.float64(0.7090708840990346), np.float64(0.827249364782207),
np.float64(0.9454278454653795), np.float64(1.063606326148552),
np.float64(1.1817848068317245), np.float64(1.2999632875148968),
np.float64(1.4181417681980693), np.float64(1.5363202488812417),
np.float64(1.654498729564414), np.float64(1.7726772102475865),
np.float64(1.890855690930759), np.float64(2.0090341716139313),
np.float64(2.127212652297104)] y_points = [1.          +0.j
0.9996327989718372+0.01980365545023521j
0.9988695968348711+0.03956051076943012j
0.9969039913311757+0.05917336568542386j
0.9949599858879605+0.0787214204199771j
0.9919935775820172+0.10103428289599203j
0.988775168570472 +0.11590232452650873j
0.9849807579461223+0.14001519204253765j
0.9795519427454398+0.1615576523614266j
0.9750159300446042+0.1749568898792917j
0.9693135140778395+0.19300734042055323j
0.9628550959942688+0.21420419977175942j
0.9552086745842889+0.23524985869960435j
0.9490166572466403+0.25307710861590405j
0.9408734344456164+0.26583554433952417j
0.9307214060199369+0.28563559977967934j
0.9221533820294696+0.30288684808317456j
0.9126565554383552+0.32061329771723357j
0.9041965317502889+0.33797974634328987j]
fit1: [ 0.6414781412319364 -0.2619260685403986]
[ 0.6414781412319364 -0.2619260685403986  0.35852185876806364
-0.          ] 3.887401194308035e-10
[ 5.1490179701571059e-01 -2.8932170708088401e-01
2.9592188344013209e-01
-6.5628057558967640e-02  1.6240836322479072e-06]
3.295078965302768e-10

```

```

E_gs: -0.289321707080884
test mps sampling took: (0.0015881061553955078, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.009841702044405518
1 Execution time: 0:01:20.764043 ovlp:
(0.9999979999999999+0.0016439999999999788j)
2 Execution time: 0:01:20.765978 ovlp:
(0.999992+0.0028820000000000051j)
3 Execution time: 0:01:20.768549 ovlp:
(0.999984+0.0035119999999999596j)
4 Execution time: 0:01:20.772250 ovlp:
(0.999968+0.0076300000000000026j)
5 Execution time: 0:01:20.776186 ovlp:
(0.999938+0.009463999999999917j)
x_points = [np.float64(0.0), np.float64(0.009841702044405518),
np.float64(0.019683404088811036), np.float64(0.029525106133216555),
np.float64(0.03936680817762207), np.float64(0.04920851022202759)]
y_points = [1.          +0.j
0.9999979999999999+0.00164399999999998j
0.999992          +0.002882000000000005j
0.999984          +0.003511999999999996j
0.999968          +0.007630000000000003j
0.999938          +0.00946399999999992j]
fit1: [ 0.07894195121809454 -3.145408891717822 ]
[ 0.07894195121809454 -3.145408891717822  0.07895195111809454
-0.          ] 1.5949809426632847e-10
[ 7.1117069574331115e-02 -2.8339143915220415e+00
7.1120481792065177e-02
-1.2539183332045827e+00  9.9315199624986965e-07]
7.525820871166743e-10
E_gs: -2.8339143915220415
test mps sampling took: (0.0013489723205566406, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.018910829231383763
1 Execution time: 0:01:20.925454 ovlp:
(0.99998639997008+0.002152204734850338j)
2 Execution time: 0:01:20.927414 ovlp:
(0.99997959995512+0.0029274064402942113j)
3 Execution time: 0:01:20.929948 ovlp:
(0.9999251998354397+0.010529823165611019j)
4 Execution time: 0:01:20.933569 ovlp:
(0.9998299996259992+0.014603032126670579j)
5 Execution time: 0:01:20.937541 ovlp:

```

```

(0.9998775997307194+0.015310233682514163j)
6 Execution time: 0:01:20.942582 ovlp:
(0.9997483994464789+0.020430644947418974j)
7 Execution time: 0:01:20.948170 ovlp:
(0.9996735992819183+0.023375051425113202j)
8 Execution time: 0:01:20.954041 ovlp:
(0.9994559988031975+0.02444945378879826j)
9 Execution time: 0:01:20.960283 ovlp:
(0.9994559988031975+0.028073861762495822j)
10 Execution time: 0:01:20.967082 ovlp:
(0.9992451983394364+0.03376547428404342j)
11 Execution time: 0:01:20.974706 ovlp:
(0.9990207978457553+0.0387226851899074j)
12 Execution time: 0:01:20.982910 ovlp:
(0.998939197666235+0.037002281405019044j)
13 Execution time: 0:01:20.991814 ovlp:
(0.9987487972473539+0.04188469214632273j)
14 Execution time: 0:01:21.001135 ovlp:
(0.9984223965292724+0.04756270463795009j)
15 Execution time: 0:01:21.012867 ovlp:
(0.9981027958261508+0.04338749545248999j)
16 Execution time: 0:01:21.023995 ovlp:
(0.9977967951529494+0.0488819075401965j)
17 Execution time: 0:01:21.035487 ovlp:
(0.9976471948238286+0.05323391711461767j)
x_points = [np.float64(0.0), np.float64(0.018910829231383763),
np.float64(0.03782165846276753), np.float64(0.05673248769415129),
np.float64(0.07564331692553505), np.float64(0.09455414615691882),
np.float64(0.11346497538830258), np.float64(0.13237580461968634),
np.float64(0.1512866338510701), np.float64(0.17019746308245387),
np.float64(0.18910829231383763), np.float64(0.2080191215452214),
np.float64(0.22692995077660516), np.float64(0.24584078000798892),
np.float64(0.2647516092393727), np.float64(0.28366243847075645),
np.float64(0.3025732677021402), np.float64(0.321484096933524)] y_points
= [1.          +0.j
0.99998639997008 +0.00215220473485034j
0.99997959995512 +0.00292740644029421j
0.9999251998354397+0.01052982316561102j
0.9998299996259992+0.01460303212667058j
0.9998775997307194+0.01531023368251416j
0.9997483994464789+0.02043064494741897j
0.9996735992819183+0.0233750514251132j
0.9994559988031975+0.02444945378879826j
0.9994559988031975+0.02807386176249582j
0.9992451983394364+0.03376547428404342j
0.9990207978457553+0.0387226851899074j
0.998939197666235 +0.03700228140501904j

```

0.9987487972473539+0.04188469214632273j
0.9984223965292724+0.04756270463795009j
0.9981027958261508+0.04338749545248999j
0.9977967951529494+0.0488819075401965j
0.9976471948238286+0.05323391711461767j]
fit1: [0.5780245744290899 -0.2909639490776272]
[0.5780245744290899 -0.2909639490776272 0.42197542557091006
-0.] 4.064683838161716e-10
[5.0461804407051969e-01 -2.5621414528987357e-01
3.7689197355381582e-01
-1.0307080518326801e-01 1.1074525615998888e-06]
4.1246233507192377e-10
E_gs: -0.2562141452898736
test mps sampling took: (0.001271963119506836, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.23474025867937806
1 Execution time: 0:01:21.547931 ovlp:
(0.9986127969481533+0.03721308186878014j)
2 Execution time: 0:01:21.549884 ovlp:
(0.9952535895578971+0.07931197448634397j)
3 Execution time: 0:01:21.552373 ovlp:
(0.989058775929307+0.11792245942941082j)
4 Execution time: 0:01:21.555571 ovlp:
(0.9801779563915041+0.1554789420536724j)
5 Execution time: 0:01:21.559310 ovlp:
(0.9705287351632172+0.19504142909114397j)
6 Execution time: 0:01:21.563620 ovlp:
(0.9561263034778678+0.233033112672848j)
7 Execution time: 0:01:21.568650 ovlp:
(0.9404250689351517+0.2660063852140475j)
8 Execution time: 0:01:21.574149 ovlp:
(0.9248190346018761+0.3008496618692562j)
9 Execution time: 0:01:21.580315 ovlp:
(0.9037729883005743+0.33374813424589544j)
10 Execution time: 0:01:21.587055 ovlp:
(0.8825365415803914+0.3690810119782264j)
11 Execution time: 0:01:21.595459 ovlp:
(0.8594572908060398+0.39709027359860194j)
12 Execution time: 0:01:21.605082 ovlp:
(0.8351336372940021+0.42427673340881356j)
13 Execution time: 0:01:21.614287 ovlp:
(0.8091983802364364+0.45275519606143133j)
14 Execution time: 0:01:21.623680 ovlp:
(0.7787207131855689+0.47726244997738987j)
15 Execution time: 0:01:21.634213 ovlp:

```

(0.7508474518643942+0.4997228993903786j)
16 Execution time: 0:01:21.645216  ovlp:
(0.724572194058827+0.5199257438366365j)
17 Execution time: 0:01:21.656545  ovlp:
(0.6917893219365083+0.5407405896292972j)
x_points = [np.float64(0.0), np.float64(0.23474025867937806),
np.float64(0.4694805173587561), np.float64(0.7042207760381342),
np.float64(0.9389610347175122), np.float64(1.1737012933968902),
np.float64(1.4084415520762683), np.float64(1.6431818107556464),
np.float64(1.8779220694350245), np.float64(2.1126623281144026),
np.float64(2.3474025867937804), np.float64(2.5821428454731588),
np.float64(2.8168831041525366), np.float64(3.051623362831915),
np.float64(3.286363621511293), np.float64(3.521103880190671),
np.float64(3.755844138870049), np.float64(3.990584397549427)] y_points =
[1.          +0.j
 0.9986127969481533+0.03721308186878014j
 0.9952535895578971+0.07931197448634397j
 0.989058775929307 +0.11792245942941082j
 0.9801779563915041+0.1554789420536724j
 0.9705287351632172+0.19504142909114397j
 0.9561263034778678+0.233033112672848j
 0.9404250689351517+0.2660063852140475j
 0.9248190346018761+0.3008496618692562j
 0.9037729883005743+0.33374813424589544j
 0.8825365415803914+0.3690810119782264j
 0.8594572908060398+0.39709027359860194j
 0.8351336372940021+0.42427673340881356j
 0.8091983802364364+0.45275519606143133j
 0.7787207131855689+0.47726244997738987j
 0.7508474518643942+0.4997228993903786j
 0.724572194058827 +0.5199257438366365j
 0.6917893219365083+0.5407405896292972j ]
fit1: [ 0.6314740591994614 -0.2609432725326686]
[ 0.3971396652919852 -0.32239409053421364  0.5472199277461869
 -0.07359298688020571] 1.1388188104199558e-10
[ 0.4876145574042096 -0.29567669766016613  0.3274622567649533
 -0.05389410677001144 -0.02832454826191951] 4.509726026826543e-10
E_gs: -0.29567669766016613
test mps sampling took: (0.0012531280517578125, Counter({2: 5, 0: 5}))
truncated ham size: 10  Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172  dt: 0.10576843734596675
1 Execution time: 0:01:21.980299  ovlp:
(0.9997419997419998+0.018051018051018053j)
2 Execution time: 0:01:21.982279  ovlp:
(0.9991299991299991+0.03758703758703752j)

```

```

3 Execution time: 0:01:21.984879 ovlp:
(0.9976659976659976+0.05670905670905668j)
4 Execution time: 0:01:21.988153 ovlp:
(0.996009996009996+0.07311907311907317j)
5 Execution time: 0:01:21.991825 ovlp:
(0.9935799935799936+0.0883530883530883j)
6 Execution time: 0:01:21.996078 ovlp:
(0.9908079908079908+0.10493110493110502j)
7 Execution time: 0:01:22.000989 ovlp:
(0.987981987981988+0.12371712371712373j)
8 Execution time: 0:01:22.006465 ovlp:
(0.9835839835839837+0.14030114030114027j)
9 Execution time: 0:01:22.013528 ovlp:
(0.9798279798279799+0.15756315756315753j)
10 Execution time: 0:01:22.021427 ovlp:
(0.9745239745239744+0.17441717441717453j)
11 Execution time: 0:01:22.029277 ovlp:
(0.9705759705759707+0.18942918942918952j)
12 Execution time: 0:01:22.037623 ovlp:
(0.9648459648459649+0.2098112098112097j)
13 Execution time: 0:01:22.046564 ovlp:
(0.9586599586599587+0.22676122676122668j)
14 Execution time: 0:01:22.056051 ovlp:
(0.9512379512379512+0.2402972402972403j)
15 Execution time: 0:01:22.066083 ovlp:
(0.9449379449379449+0.2592752592752592j)
x_points = [np.float64(0.0), np.float64(0.10576843734596675),
np.float64(0.2115368746919335), np.float64(0.31730531203790024),
np.float64(0.423073749383867), np.float64(0.5288421867298337),
np.float64(0.6346106240758005), np.float64(0.7403790614217672),
np.float64(0.846147498767734), np.float64(0.9519159361137007),
np.float64(1.0576843734596675), np.float64(1.1634528108056341),
np.float64(1.269221248151601), np.float64(1.3749896854975678),
np.float64(1.4807581228435345), np.float64(1.5865265601895011)] y_points
= [1.          +0.j
0.9997419997419998+0.01805101805101805j
0.9991299991299991+0.03758703758703752j
0.9976659976659976+0.05670905670905668j
0.996009996009996 +0.07311907311907317j
0.9935799935799936+0.0883530883530883j
0.9908079908079908+0.10493110493110502j
0.987981987981988 +0.12371712371712373j
0.9835839835839837+0.14030114030114027j
0.9798279798279799+0.15756315756315753j
0.9745239745239744+0.17441717441717453j
0.9705759705759707+0.18942918942918952j
0.9648459648459649+0.2098112098112097j

```

0.9586599586599587+0.22676122676122668j
0.9512379512379512+0.2402972402972403j
0.9449379449379449+0.2592752592752592j]
fit1: [0.6319737082019914 -0.26516128905878483]
[0.6319737082019914 -0.26516128905878483 0.3680262917980086
-0.] 1.387116232835116e-10
[5.1503219167271908e-01 -2.8887030503750427e-01
2.7030875028012658e-01
-7.0442238971064317e-02 3.8209699940374030e-06]
1.3263918420209016e-10
E_gs: -0.28887030503750427
test mps sampling took: (0.0013251304626464844, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.18693508907772158
1 Execution time: 0:01:22.513301 ovlp:
(0.999296+0.0342080000000000016j)
2 Execution time: 0:01:22.515339 ovlp:
(0.99684480000000001+0.061964799999999993j)
3 Execution time: 0:01:22.517924 ovlp:
(0.9927872+0.094598399999999997j)
4 Execution time: 0:01:22.521241 ovlp:
(0.9872255999999999+0.123788800000000003j)
5 Execution time: 0:01:22.524949 ovlp:
(0.98080640000000001+0.155635200000000008j)
6 Execution time: 0:01:22.529196 ovlp:
(0.9728319999999999+0.184134400000000003j)
7 Execution time: 0:01:22.534197 ovlp: (0.9617856+0.2128192j)
8 Execution time: 0:01:22.539758 ovlp:
(0.9511487999999999+0.24602239999999997j)
9 Execution time: 0:01:22.546042 ovlp:
(0.9385087999999999+0.274835200000000006j)
10 Execution time: 0:01:22.552731 ovlp: (0.92384+0.301984000000000003j)
11 Execution time: 0:01:22.561058 ovlp: (0.90887040000000001+0.3271168j)
12 Execution time: 0:01:22.570790 ovlp:
(0.89241600000000001+0.353504000000000004j)
13 Execution time: 0:01:22.579746 ovlp:
(0.8741504+0.37999999999999999j)
14 Execution time: 0:01:22.590060 ovlp:
(0.8571135999999999+0.400870400000000007j)
15 Execution time: 0:01:22.601099 ovlp:
(0.8353728+0.42378239999999999j)
16 Execution time: 0:01:22.611765 ovlp:
(0.81520640000000001+0.44587519999999999j)
x_points = [np.float64(0.0), np.float64(0.18693508907772158),
np.float64(0.37387017815544316), np.float64(0.5608052672331647),


```

np.float64(0.7477403563108863), np.float64(0.9346754453886079),
np.float64(1.1216105344663294), np.float64(1.3085456235440511),
np.float64(1.4954807126217726), np.float64(1.6824158016994941),
np.float64(1.8693508907772158), np.float64(2.0562859798549376),
np.float64(2.243221068932659), np.float64(2.4301561580103805),
np.float64(2.6170912470881023), np.float64(2.8040263361658235),
np.float64(2.9909614252435452)] y_points = [1.          +0.j
0.999296          +0.034208000000000002j
0.9968448000000001+0.061964799999999993j
0.9927872         +0.094598399999999997j
0.9872255999999999+0.123788800000000003j
0.9808064000000001+0.155635200000000008j
0.9728319999999999+0.184134400000000003j
0.9617856         +0.2128192j
0.9511487999999999+0.246022399999999997j
0.9385087999999999+0.274835200000000006j
0.92384           +0.301984000000000003j
0.9088704000000001+0.3271168j
0.8924160000000001+0.353504000000000004j
0.8741504         +0.37999999999999999j
0.8571135999999999+0.400870400000000007j
0.8353728         +0.42378239999999999j
0.8152064000000001+0.44587519999999999j ]
fit1: [ 0.6333733584553894 -0.2632797811744715]
[ 0.6333733584553894 -0.2632797811744715  0.36662664154461055
-0.          ] 2.998547704588222e-10
[ 5.1213248272599710e-01 -2.8826443449387185e-01
2.4886061930652606e-01
-8.0187915030206211e-02  1.8669705627145860e-06]
1.3668143393210892e-10
E_gs: -0.28826443449387185
test mps sampling took: (0.001294851303100586, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.19935583870987103
1 Execution time: 0:01:23.009923 ovlp:
(0.9990955980103156+0.037933883454543516j)
2 Execution time: 0:01:23.011812 ovlp:
(0.9964503921908627+0.06460354212779262j)
3 Execution time: 0:01:23.014283 ovlp:
(0.9921459827211621+0.10111962246316941j)
4 Execution time: 0:01:23.018040 ovlp:
(0.98552276815009+0.133256493164285j)
5 Execution time: 0:01:23.021995 ovlp:
(0.9782467521428546+0.16918777221309877j)
6 Execution time: 0:01:23.027111 ovlp:

```

```
(0.9680195296429652+0.19836663640660013j)
7 Execution time: 0:01:23.032470  ovlp:
(0.9564799042557894+0.2314351091572402j)
8 Execution time: 0:01:23.038261  ovlp:
(0.9447906785394928+0.2613211749065847j)
9 Execution time: 0:01:23.045186  ovlp:
(0.9302454465399823+0.28810643383415435j)
10 Execution time: 0:01:23.053029  ovlp:
(0.9140410108902239+0.3164964962922918j)
11 Execution time: 0:01:23.062490  ovlp:
(0.8963473719642183+0.34655256241563737j)
12 Execution time: 0:01:23.072068  ovlp:
(0.8780213316469296+0.37502422505329513j)
13 Execution time: 0:01:23.081832  ovlp:
(0.8587432892352362+0.3997694794928548j)
14 Execution time: 0:01:23.094273  ovlp:
(0.8356572384459247+0.4218899281578419j)
15 Execution time: 0:01:23.105658  ovlp:
(0.8149851929674246+0.44604358129587895j)
16 Execution time: 0:01:23.118559  ovlp:
(0.7923003430607547+0.4672596279711816j)
17 Execution time: 0:01:23.130310  ovlp:
(0.7681670899675979+0.4883940744669639j)
x_points = [np.float64(0.0), np.float64(0.19935583870987103),
np.float64(0.39871167741974206), np.float64(0.5980675161296131),
np.float64(0.7974233548394841), np.float64(0.9967791935493552),
np.float64(1.1961350322592261), np.float64(1.3954908709690972),
np.float64(1.5948467096789682), np.float64(1.7942025483888393),
np.float64(1.9935583870987104), np.float64(2.192914225808581),
np.float64(2.3922700645184523), np.float64(2.5916259032283233),
np.float64(2.7909817419381944), np.float64(2.9903375806480654),
np.float64(3.1896934193579365), np.float64(3.3890492580678075)]
y_points = [1.          +0.j
0.9990955980103156+0.03793388345454352j
0.9964503921908627+0.06460354212779262j
0.9921459827211621+0.10111962246316941j
0.98552276815009  +0.133256493164285j
0.9782467521428546+0.16918777221309877j
0.9680195296429652+0.19836663640660013j
0.9564799042557894+0.2314351091572402j
0.9447906785394928+0.2613211749065847j
0.9302454465399823+0.28810643383415435j
0.9140410108902239+0.3164964962922918j
0.8963473719642183+0.34655256241563737j
0.8780213316469296+0.37502422505329513j
0.8587432892352362+0.3997694794928548j
0.8356572384459247+0.4218899281578419j
```

```

0.8149851929674246+0.44604358129587895j
0.7923003430607547+0.4672596279711816j
0.7681670899675979+0.4883940744669639j ]
fit1: [ 0.6323371261546972 -0.26300550904470055]
[ 6.320844477825271e-01 -2.628097098118860e-01
3.676632314832435e-01
-6.033122848517030e-04] 1.4729389613288826e-09
[ 5.1932394705123175e-01 -2.8734828002711599e-01
2.8000583244220145e-01
-6.5037599725462206e-02 -9.3548997135755034e-05]
6.434251810709197e-10
E_gs: -0.287348280027116
test mps sampling took: (0.0013170242309570312, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.18585141099154573
1 Execution time: 0:01:23.538493 ovlp:
(0.9991935996774399+0.0312612125044851j)
2 Execution time: 0:01:23.540439 ovlp:
(0.9970407988163195+0.06259322503729003j)
3 Execution time: 0:01:23.543834 ovlp:
(0.9930951972380788+0.09358443743377487j)
4 Execution time: 0:01:23.546984 ovlp:
(0.9875799950319981+0.1238316495326599j)
5 Execution time: 0:01:23.550648 ovlp:
(0.980723192289277+0.1547196618878648j)
6 Execution time: 0:01:23.555537 ovlp:
(0.9726231890492756+0.18443167377266945j)
x_points = [np.float64(0.0), np.float64(0.18585141099154573),
np.float64(0.37170282198309146), np.float64(0.5575542329746372),
np.float64(0.7434056439661829), np.float64(0.9292570549577286),
np.float64(1.1151084659492745)] y_points = [1.          +0.j
0.9991935996774399+0.0312612125044851j
0.9970407988163195+0.06259322503729003j
0.9930951972380788+0.09358443743377487j
0.9875799950319981+0.1238316495326599j
0.980723192289277 +0.1547196618878648j
0.9726231890492756+0.18443167377266945j]
fit1: [ 0.5818366219463547 -0.2884655476656481]
[ 0.5818366219463547 -0.2884655476656481 0.41816337805364534
-0.          ] 2.3931121952817408e-11
[ 4.8051792848351016e-01 -2.8572532280458585e-01
3.3517307477974873e-01
-9.3870723070669265e-02 8.1048502562487855e-06]
7.06730192600542e-12
E_gs: -0.28572532280458585

```

test mps sampling took: (0.0013887882232666016, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.20534773419817487
1 Execution time: 0:01:24.317374 ovlp:
(0.999121597540473+0.0334044935325819j)
2 Execution time: 0:01:24.319370 ovlp:
(0.9964503900610922+0.06859819207493789j)
3 Execution time: 0:01:24.321952 ovlp:
(0.9915615763724139+0.10497269392354291j)
4 Execution time: 0:01:24.325636 ovlp:
(0.9848151574824409+0.13942479038941302j)
5 Execution time: 0:01:24.329625 ovlp:
(0.9769239353870192+0.17111207911382142j)
6 Execution time: 0:01:24.334133 ovlp:
(0.9672543083120633+0.2025833672334283j)
7 Execution time: 0:01:24.339433 ovlp:
(0.9551006742818879+0.23438585628039754j)
8 Execution time: 0:01:24.346736 ovlp:
(0.9395558307563261+0.26677874698049164j)
9 Execution time: 0:01:24.353504 ovlp:
(0.9264877941658236+0.2994740385273078j)
10 Execution time: 0:01:24.360649 ovlp:
(0.9092725459631288+0.3252357106599899j)
11 Execution time: 0:01:24.368367 ovlp:
(0.890170892478499+0.35587179644103006j)
12 Execution time: 0:01:24.376734 ovlp:
(0.8721924421388381+0.38089906651738614j)
13 Execution time: 0:01:24.387695 ovlp:
(0.8511467832109929+0.408914344960166j)
14 Execution time: 0:01:24.398011 ovlp:
(0.8281427187996127+0.43331521328259726j)
15 Execution time: 0:01:24.408197 ovlp:
(0.807269860355609+0.45633367773429767j)
16 Execution time: 0:01:24.421631 ovlp:
(0.780874586448842+0.4751833305133255j)
17 Execution time: 0:01:24.435683 ovlp:
(0.7565745184086516+0.4971793921022978j)
18 Execution time: 0:01:24.448532 ovlp:
(0.7279112381514667+0.5132858372003442j)
x_points = [np.float64(0.0), np.float64(0.20534773419817487),
np.float64(0.41069546839634974), np.float64(0.6160432025945246),
np.float64(0.8213909367926995), np.float64(1.0267386709908743),
np.float64(1.2320864051890492), np.float64(1.437434139387224),
np.float64(1.642781873585399), np.float64(1.8481296077835738),
np.float64(2.0534773419817487), np.float64(2.2588250761799236),

```

np.float64(2.4641728103780984), np.float64(2.6695205445762733),
np.float64(2.874868278774448), np.float64(3.080216012972623),
np.float64(3.285563747170798), np.float64(3.490911481368973),
np.float64(3.6962592155671476)] y_points = [1.          +0.j
0.999121597540473 +0.0334044935325819j
0.9964503900610922+0.06859819207493789j
0.9915615763724139+0.10497269392354291j
0.9848151574824409+0.13942479038941302j
0.9769239353870192+0.17111207911382142j
0.9672543083120633+0.2025833672334283j
0.9551006742818879+0.23438585628039754j
0.9395558307563261+0.26677874698049164j
0.9264877941658236+0.2994740385273078j
0.9092725459631288+0.3252357106599899j
0.890170892478499 +0.35587179644103006j
0.8721924421388381+0.38089906651738614j
0.8511467832109929+0.408914344960166j
0.8281427187996127+0.43331521328259726j
0.807269860355609 +0.45633367773429767j
0.780874586448842 +0.4751833305133255j
0.7565745184086516+0.4971793921022978j
0.7279112381514667+0.5132858372003442j ]
fit1: [ 0.6276991837129294 -0.26331625012265925]
[ 0.5850957434860306 -0.2728059771505482  0.37287400962099093
-0.01691973499756565] 1.4133715031464022e-09
[ 0.4532223027242286 -0.3039901732280237  0.3371904176182836
-0.08183075043328877 -0.00955539887895271] 3.0965881756495787e-10
E_gs: -0.3039901732280237
test mps sampling took: (0.0012614727020263672, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2859558535269329
1 Execution time: 0:01:24.817729 ovlp:
(0.9980991969587152+0.04848487757580422j)
2 Execution time: 0:01:24.819833 ovlp:
(0.992550388080621+0.09565935305496498j)
3 Execution time: 0:01:24.822537 ovlp:
(0.9834783735653978+0.1416434266294826j)
4 Execution time: 0:01:24.826169 ovlp:
(0.9719295550872882+0.18865470184752287j)
5 Execution time: 0:01:24.830065 ovlp:
(0.9546495274392439+0.23399557439291896j)
6 Execution time: 0:01:24.835084 ovlp:
(0.935171096273754+0.28017164827463725j)
7 Execution time: 0:01:24.840602 ovlp:
(0.9128606605770568+0.3183989094382551j)

```

```

8 Execution time: 0:01:24.846436 ovlp:
(0.8901950243120389+0.35801817282907655j)
9 Execution time: 0:01:24.853288 ovlp:
(0.8623645797833277+0.39560223296357266j)
10 Execution time: 0:01:24.861073 ovlp:
(0.828927726284362+0.4292694868311788j)
11 Execution time: 0:01:24.868893 ovlp:
(0.7993212789140463+0.4603063364901383j)
12 Execution time: 0:01:24.877177 ovlp:
(0.762486019977632+0.4924183878694206j)
13 Execution time: 0:01:24.886113 ovlp:
(0.7287611660178657+0.521861634978616j)
14 Execution time: 0:01:24.895787 ovlp:
(0.6874138998622399+0.5377784604455367j)
15 Execution time: 0:01:24.906110 ovlp:
(0.6541978467165548+0.5613752982004772j)
16 Execution time: 0:01:24.918587 ovlp:
(0.6106809770895634+0.5755929209486734j)
17 Execution time: 0:01:24.930346 ovlp:
(0.5694009110414577+0.5904249446799115j)
18 Execution time: 0:01:24.943387 ovlp:
(0.5332568532109652+0.5970009552015283j)
19 Execution time: 0:01:24.957488 ovlp:
(0.4901047841676547+0.6063513701621923j)
20 Execution time: 0:01:24.973579 ovlp:
(0.45279912447859916+0.6074361718978751j)
21 Execution time: 0:01:24.990716 ovlp:
(0.4200726721162753+0.6074937719900353j)
22 Execution time: 0:01:25.006841 ovlp:
(0.37802460483936784+0.6063609701775523j)
23 Execution time: 0:01:25.025031 ovlp:
(0.3445973513557621+0.5974329558927294j)
24 Execution time: 0:01:25.044593 ovlp:
(0.311688498701598+0.5886105417768668j)
x_points = [np.float64(0.0), np.float64(0.2859558535269329),
np.float64(0.5719117070538658), np.float64(0.8578675605807988),
np.float64(1.1438234141077317), np.float64(1.4297792676346646),
np.float64(1.7157351211615977), np.float64(2.0016909746885303),
np.float64(2.2876468282154634), np.float64(2.5736026817423965),
np.float64(2.859558535269329), np.float64(3.145514388796262),
np.float64(3.4314702423231953), np.float64(3.717426095850128),
np.float64(4.003381949377061), np.float64(4.289337802903994),
np.float64(4.575293656430927), np.float64(4.86124950995786),
np.float64(5.147205363484793), np.float64(5.433161217011725),
np.float64(5.719117070538658), np.float64(6.005072924065591),
np.float64(6.291028777592524), np.float64(6.5769846311194575),
np.float64(6.862940484646391)] y_points = [1.          +0.j

```

0.9980991969587152 +0.04848487757580422j
 0.992550388080621 +0.09565935305496498j
 0.9834783735653978 +0.1416434266294826j
 0.9719295550872882 +0.18865470184752287j
 0.9546495274392439 +0.23399557439291896j
 0.935171096273754 +0.28017164827463725j
 0.9128606605770568 +0.3183989094382551j
 0.8901950243120389 +0.35801817282907655j
 0.8623645797833277 +0.39560223296357266j
 0.828927726284362 +0.4292694868311788j
 0.7993212789140463 +0.4603063364901383j
 0.762486019977632 +0.4924183878694206j
 0.7287611660178657 +0.521861634978616j
 0.6874138998622399 +0.5377784604455367j
 0.6541978467165548 +0.5613752982004772j
 0.6106809770895634 +0.5755929209486734j
 0.5694009110414577 +0.5904249446799115j
 0.5332568532109652 +0.5970009552015283j
 0.4901047841676547 +0.6063513701621923j
 0.45279912447859916+0.6074361718978751j
 0.4200726721162753 +0.6074937719900353j
 0.37802460483936784+0.6063609701775523j
 0.3445973513557621 +0.5974329558927294j
 0.311688498701598 +0.5886105417768668j]
 fit1: [0.6125345170860499 -0.25565703254807853]
 [0.3837659956068905 -0.31954180604980675 0.46569367706872306
 -0.09307688688759518] 1.9613610331526572e-08
 [0.3778021377176889 -0.3286726852210627 0.4088213433872394
 -0.07946072631286592 -0.0569797587387154] 1.6656760506182323e-09
 E_gs: -0.3286726852210627
 test mps sampling took: (0.0012929439544677734, Counter({2: 6, 0: 4}))
 truncated ham size: 10 Number of fitting points: 13
 shots per matrix element: 416666.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.13756516060782897
 1 Execution time: 0:01:25.615484 ovlp:
 (0.9996063993702391+0.02289603663365858j)
 2 Execution time: 0:01:25.617483 ovlp:
 (0.9983199973119956+0.04566727306763685j)
 3 Execution time: 0:01:25.620186 ovlp:
 (0.9959343934950295+0.06994571191313903j)
 4 Execution time: 0:01:25.623722 ovlp:
 (0.993390389424623+0.09178574685719498j)
 5 Execution time: 0:01:25.627709 ovlp:
 (0.9892863828582126+0.11417298267677234j)
 6 Execution time: 0:01:25.632349 ovlp:
 (0.9848703757926012+0.14076022521636045j)

```

7 Execution time: 0:01:25.637397  ovlp:
(0.9797583676133881+0.1592690548304878j)
8 Execution time: 0:01:25.642943  ovlp:
(0.9729183566693707+0.18329789327662915j)
9 Execution time: 0:01:25.649367  ovlp:
(0.9665247464395943+0.20520032832052526j)
10 Execution time: 0:01:25.656135  ovlp:
(0.9587439339902943+0.22405955849529358j)
11 Execution time: 0:01:25.663881  ovlp:
(0.9497439195902713+0.24920679873087792j)
12 Execution time: 0:01:25.672237  ovlp:
(0.9408975054360087+0.2687620300192479j)
x_points = [np.float64(0.0), np.float64(0.13756516060782897),
np.float64(0.27513032121565795), np.float64(0.4126954818234869),
np.float64(0.5502606424313159), np.float64(0.6878258030391449),
np.float64(0.8253909636469738), np.float64(0.9629561242548028),
np.float64(1.1005212848626318), np.float64(1.2380864454704608),
np.float64(1.3756516060782897), np.float64(1.5132167666861187),
np.float64(1.6507819272939477)] y_points = [1.          +0.j
0.9996063993702391+0.02289603663365858j
0.9983199973119956+0.04566727306763685j
0.9959343934950295+0.06994571191313903j
0.993390389424623 +0.09178574685719498j
0.9892863828582126+0.11417298267677234j
0.9848703757926012+0.14076022521636045j
0.9797583676133881+0.1592690548304878j
0.9729183566693707+0.18329789327662915j
0.9665247464395943+0.20520032832052526j
0.9587439339902943+0.22405955849529358j
0.9497439195902713+0.24920679873087792j
0.9408975054360087+0.2687620300192479j ]
fit1: [ 0.631316370942323 -0.26649606864962566]
[ 0.631316370942323 -0.26649606864962566 0.36868362905767704
-0.          ] 6.098707915348056e-11
[ 5.1682540998246629e-01 -2.8518691104423466e-01
2.6893951961409823e-01
-7.8675739787739091e-02 4.3287238719605765e-06]
5.924794329980494e-11
E_gs: -0.28518691104423466
test mps sampling took: (0.0012900829315185547, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.20622094405424757
1 Execution time: 0:01:26.049281  ovlp:
(0.9991071985715176+0.03370085392136635j)
2 Execution time: 0:01:26.051378  ovlp:

```


(0.9964383943014308+0.07155371448594328j)
3 Execution time: 0:01:26.053978 ovlp:
(0.991398386237418+0.1062193699509919j)
4 Execution time: 0:01:26.057295 ovlp:
(0.9852447763916423+0.1372082195331512j)
5 Execution time: 0:01:26.061115 ovlp:
(0.9768255629209006+0.17462907940652705j)
6 Execution time: 0:01:26.065471 ovlp:
(0.9659871455794329+0.20562752900404635j)
7 Execution time: 0:01:26.070572 ovlp:
(0.9539583263333222+0.23388037420859864j)
8 Execution time: 0:01:26.076147 ovlp:
(0.9413247061195298+0.2671828274925241j)
9 Execution time: 0:01:26.082315 ovlp:
(0.9265694825111721+0.29755727609164184j)
10 Execution time: 0:01:26.089022 ovlp:
(0.908559853695766+0.3299765279624447j)
11 Execution time: 0:01:26.096383 ovlp:
(0.8910494256790811+0.35358296573274517j)
12 Execution time: 0:01:26.104504 ovlp:
(0.8685181896291034+0.38007900812641293j)
13 Execution time: 0:01:26.113217 ovlp:
(0.8478685565896906+0.41450466320746115j)
14 Execution time: 0:01:26.124316 ovlp:
(0.8263837222139556+0.431266290026064j)
15 Execution time: 0:01:26.134988 ovlp:
(0.8015292824468518+0.45778153245045194j)
16 Execution time: 0:01:26.145644 ovlp:
(0.7789980463968742+0.47856556570490505j)
17 Execution time: 0:01:26.159037 ovlp:
(0.7554204086726539+0.4964215942745509j)
18 Execution time: 0:01:26.171614 ovlp:
(0.7299227678764286+0.5167352267763627j)
19 Execution time: 0:01:26.184139 ovlp:
(0.7003835206136331+0.5327288523661637j)
20 Execution time: 0:01:26.197352 ovlp:
(0.6749530799249279+0.5506808810894097j)
21 Execution time: 0:01:26.211137 ovlp:
(0.6447610316176506+0.5606648970638353j)
22 Execution time: 0:01:26.225373 ovlp:
(0.6163065860905377+0.5754393207029131j)
23 Execution time: 0:01:26.240588 ovlp:
(0.5855961369538192+0.58590333744534j)
24 Execution time: 0:01:26.258624 ovlp:
(0.5567384907815853+0.5928825486120777j)
x_points = [np.float64(0.0), np.float64(0.20622094405424757),
np.float64(0.41244188810849514), np.float64(0.6186628321627428),

```

np.float64(0.8248837762169903), np.float64(1.0311047202712378),
np.float64(1.2373256643254855), np.float64(1.443546608379733),
np.float64(1.6497675524339805), np.float64(1.855988496488228),
np.float64(2.0622094405424756), np.float64(2.2684303845967233),
np.float64(2.474651328650971), np.float64(2.6808722727052183),
np.float64(2.887093216759466), np.float64(3.0933141608137134),
np.float64(3.299535104867961), np.float64(3.505756048922209),
np.float64(3.711976992976456), np.float64(3.918197937030704),
np.float64(4.124418881084951), np.float64(4.330639825139199),
np.float64(4.536860769193447), np.float64(4.743081713247694),
np.float64(4.949302657301942)] y_points = [1.          +0.j
0.9991071985715176+0.03370085392136635j
0.9964383943014308+0.07155371448594328j
0.991398386237418 +0.1062193699509919j
0.9852447763916423+0.1372082195331512j
0.9768255629209006+0.17462907940652705j
0.9659871455794329+0.20562752900404635j
0.9539583263333222+0.23388037420859864j
0.9413247061195298+0.2671828274925241j
0.9265694825111721+0.29755727609164184j
0.908559853695766 +0.3299765279624447j
0.8910494256790811+0.35358296573274517j
0.8685181896291034+0.38007900812641293j
0.8478685565896906+0.41450466320746115j
0.8263837222139556+0.431266290026064j
0.8015292824468518+0.45778153245045194j
0.7789980463968742+0.47856556570490505j
0.7554204086726539+0.4964215942745509j
0.7299227678764286+0.5167352267763627j
0.7003835206136331+0.5327288523661637j
0.6749530799249279+0.5506808810894097j
0.6447610316176506+0.5606648970638353j
0.6163065860905377+0.5754393207029131j
0.5855961369538192+0.58590333744534j
0.5567384907815853+0.5928825486120777j ]
fit1: [ 0.6254133484088559 -0.2609020871885226]
[ 0.45898375494510785 -0.30142266749350755 0.3994932860819243
-0.0714284661535356 ] 3.040473921458452e-09
[ 0.4243291787572179 -0.31385904784722446 0.33254359486067653
-0.07787256878092932 -0.03674665327436438]
1.2051554544342338e-09
E_gs: -0.31385904784722446
test mps sampling took: (0.0013117790222167969, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1870430230570207

```

1 Execution time: 0:01:26.947417 ovlp:
(0.9992915990082387+0.028717840204976364j)
2 Execution time: 0:01:26.949399 ovlp:
(0.9969731957624741+0.06378828930360503j)
3 Execution time: 0:01:26.951967 ovlp:
(0.9927319898247857+0.09758913662479118j)
4 Execution time: 0:01:26.955094 ovlp:
(0.9875247825346956+0.12559397583156606j)
5 Execution time: 0:01:26.958898 ovlp:
(0.9807811730936424+0.1575088205123487j)
6 Execution time: 0:01:26.963165 ovlp:
(0.971912360677305+0.1879424631194484j)
7 Execution time: 0:01:26.968007 ovlp:
(0.9616451463032047+0.21391409947973927j)
8 Execution time: 0:01:26.973595 ovlp:
(0.9501819302547023+0.24266413972979572j)
9 Execution time: 0:01:26.981006 ovlp:
(0.9383047136265992+0.26805617527864545j)
10 Execution time: 0:01:26.987969 ovlp:
(0.9247346946285724+0.30453422634791694j)
11 Execution time: 0:01:26.995417 ovlp:
(0.9099502739303835+0.3266418572986003j)
12 Execution time: 0:01:27.003567 ovlp:
(0.8932522505531508+0.35450869631217485j)
13 Execution time: 0:01:27.013280 ovlp:
(0.8750730251022352+0.3794131311783837j)
14 Execution time: 0:01:27.023593 ovlp:
(0.8556793979511572+0.4018703626185076j)
15 Execution time: 0:01:27.033654 ovlp:
(0.8345561683786358+0.42460359444503215j)
16 Execution time: 0:01:27.044249 ovlp:
(0.8140217396304354+0.448496027894439j)
17 Execution time: 0:01:27.057576 ovlp:
(0.7924109093752731+0.46636245290743417j)
18 Execution time: 0:01:27.070993 ovlp:
(0.7705424787594704+0.4852776793887512j)
19 Execution time: 0:01:27.084283 ovlp:
(0.7488304483626278+0.5032269045176663j)
20 Execution time: 0:01:27.097570 ovlp:
(0.7222976112166557+0.5173581243013741j)
21 Execution time: 0:01:27.113934 ovlp:
(0.6989663785529299+0.5364205509887714j)
22 Execution time: 0:01:27.130624 ovlp:
(0.6764631470484059+0.5488681684154357j)
23 Execution time: 0:01:27.146034 ovlp:
(0.6487987083181916+0.5605705847988187j)
x_points = [np.float64(0.0), np.float64(0.1870430230570207),

```

np.float64(0.3740860461140414), np.float64(0.5611290691710621),
np.float64(0.7481720922280828), np.float64(0.9352151152851035),
np.float64(1.1222581383421242), np.float64(1.3093011613991448),
np.float64(1.4963441844561656), np.float64(1.6833872075131864),
np.float64(1.870430230570207), np.float64(2.0574732536272275),
np.float64(2.2445162766842484), np.float64(2.431559299741269),
np.float64(2.6186023227982895), np.float64(2.8056453458553103),
np.float64(2.992688368912331), np.float64(3.179731391969352),
np.float64(3.3667744150263728), np.float64(3.553817438083393),
np.float64(3.740860461140414), np.float64(3.9279034841974347),
np.float64(4.114946507254455), np.float64(4.301989530311476)] y_points =
[1.          +0.j
 0.9992915990082387+0.02871784020497636j
 0.9969731957624741+0.06378828930360503j
 0.9927319898247857+0.09758913662479118j
 0.9875247825346956+0.12559397583156606j
 0.9807811730936424+0.1575088205123487j
 0.971912360677305 +0.1879424631194484j
 0.9616451463032047+0.21391409947973927j
 0.9501819302547023+0.24266413972979572j
 0.9383047136265992+0.26805617527864545j
 0.9247346946285724+0.30453422634791694j
 0.9099502739303835+0.3266418572986003j
 0.8932522505531508+0.35450869631217485j
 0.8750730251022352+0.3794131311783837j
 0.8556793979511572+0.4018703626185076j
 0.8345561683786358+0.42460359444503215j
 0.8140217396304354+0.448496027894439j
 0.7924109093752731+0.46636245290743417j
 0.7705424787594704+0.4852776793887512j
 0.7488304483626278+0.5032269045176663j
 0.7222976112166557+0.5173581243013741j
 0.6989663785529299+0.5364205509887714j
 0.6764631470484059+0.5488681684154357j
 0.6487987083181916+0.5605705847988187j ]
fit1: [ 0.6294729183089981 -0.26112637642886055]
[ 0.5008571824229088 -0.29125620552204995 0.3809047746410741
 -0.05445030039443027] 2.42448599757551e-09
[ 0.47847348495033243 -0.29782032500252104 0.3288966341558937
 -0.06168297788754746 -0.02237231039420212] 1.553624566465726e-09
E_gs: -0.29782032500252104
test mps sampling took: (0.001375436782836914, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2619540133279144
1 Execution time: 0:01:27.628768 ovlp:

```

```

(0.9984291984291984+0.04569184569184559j)
2 Execution time: 0:01:27.630837 ovlp:
(0.9935275935275936+0.08728068728068727j)
3 Execution time: 0:01:27.633955 ovlp:
(0.9859991859991859+0.13060313060313056j)
4 Execution time: 0:01:27.637936 ovlp:
(0.975931975931976+0.17616517616517613j)
5 Execution time: 0:01:27.642546 ovlp:
(0.9621819621819623+0.21470481470481473j)
6 Execution time: 0:01:27.647676 ovlp:
(0.9454487454487455+0.2566060566060566j)
7 Execution time: 0:01:27.653856 ovlp:
(0.9271359271359272+0.29482889482889485j)
8 Execution time: 0:01:27.659399 ovlp:
(0.9053207053207053+0.3316305316305317j)
9 Execution time: 0:01:27.667039 ovlp:
(0.8815122815122816+0.37049577049577054j)
10 Execution time: 0:01:27.675357 ovlp:
(0.8553322553322553+0.4021142021142021j)
11 Execution time: 0:01:27.684555 ovlp:
(0.8263054263054264+0.4328350328350328j)
x_points = [np.float64(0.0), np.float64(0.2619540133279144),
np.float64(0.5239080266558288), np.float64(0.7858620399837433),
np.float64(1.0478160533116576), np.float64(1.309770066639572),
np.float64(1.5717240799674865), np.float64(1.8336780932954009),
np.float64(2.0956321066233152), np.float64(2.35758611995123),
np.float64(2.619540133279144), np.float64(2.8814941466070585)] y_points
= [1.          +0.j
0.9984291984291984+0.04569184569184559j
0.9935275935275936+0.08728068728068727j
0.9859991859991859+0.13060313060313056j
0.975931975931976 +0.17616517616517613j
0.9621819621819623+0.21470481470481473j
0.9454487454487455+0.2566060566060566j
0.9271359271359272+0.29482889482889485j
0.9053207053207053+0.3316305316305317j
0.8815122815122816+0.37049577049577054j
0.8553322553322553+0.4021142021142021j
0.8263054263054264+0.4328350328350328j ]
fit1: [ 0.632804694239127 -0.2637009774276452]
[ 0.632804694239127 -0.2637009774276452 0.367195305760873
-0.          ] 1.47372272862833e-10
[ 5.1105331908838147e-01 -2.8917828404076257e-01
2.6927742557234857e-01
-7.4032351445373262e-02 2.4317872594894015e-06]
6.041659647463785e-11
E_gs: -0.28917828404076257

```

test mps sampling took: (0.001298666000366211, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2694659521410742
1 Execution time: 0:01:28.085443 ovlp:
(0.998248794396142+0.04300573761836035j)
2 Execution time: 0:01:28.087430 ovlp:
(0.9939807807384984+0.09379950015840044j)
3 Execution time: 0:01:28.090028 ovlp:
(0.9848111513956845+0.13446443028617683j)
4 Execution time: 0:01:28.093350 ovlp:
(0.9743479179133374+0.18214298285754515j)
5 Execution time: 0:01:28.097082 ovlp:
(0.9601886726037523+0.22317751416804543j)
6 Execution time: 0:01:28.101359 ovlp:
(0.9431166179731776+0.26055123376394795j)
7 Execution time: 0:01:28.106353 ovlp:
(0.9238797564152206+0.3034161709317469j)
8 Execution time: 0:01:28.111854 ovlp:
(0.9009644830863459+0.33991868773980083j)
9 Execution time: 0:01:28.117929 ovlp:
(0.8756468020697665+0.3761220035904116j)
10 Execution time: 0:01:28.124657 ovlp:
(0.84962511880038+0.412017318455419j)
11 Execution time: 0:01:28.133057 ovlp:
(0.818745819986624+0.442280615297969j)
12 Execution time: 0:01:28.142997 ovlp:
(0.7871625189200606+0.47112710760674426j)
13 Execution time: 0:01:28.153529 ovlp:
(0.751364004364814+0.49471998310394594j)
14 Execution time: 0:01:28.164779 ovlp:
(0.7194815023408074+0.5259160829314653j)
15 Execution time: 0:01:28.174943 ovlp:
(0.6872997993593579+0.5446865429969376j)
16 Execution time: 0:01:28.185634 ovlp:
(0.6441532612904362+0.5595321905030095j)
17 Execution time: 0:01:28.196989 ovlp:
(0.6115579569854623+0.5776250484001548j)
18 Execution time: 0:01:28.208696 ovlp:
(0.574025836882678+0.5901914886127635j)
19 Execution time: 0:01:28.221062 ovlp:
(0.5357369143581259+0.598041113731564j)
20 Execution time: 0:01:28.236731 ovlp:
(0.49762399239677557+0.606145939667007j)
21 Execution time: 0:01:28.250664 ovlp:
(0.46230947939033395+0.6076243443979021j)

```

22 Execution time: 0:01:28.267419  ovlp:
(0.42619416382132425+0.6073955436657397j)
x_points = [np.float64(0.0), np.float64(0.2694659521410742),
np.float64(0.5389319042821484), np.float64(0.8083978564232226),
np.float64(1.0778638085642969), np.float64(1.3473297607053711),
np.float64(1.6167957128464452), np.float64(1.8862616649875195),
np.float64(2.1557276171285937), np.float64(2.425193569269668),
np.float64(2.6946595214107423), np.float64(2.9641254735518165),
np.float64(3.2335914256928904), np.float64(3.5030573778339646),
np.float64(3.772523329975039), np.float64(4.041989282116114),
np.float64(4.3114552342571875), np.float64(4.580921186398261),
np.float64(4.850387138539336), np.float64(5.11985309068041),
np.float64(5.3893190428214846), np.float64(5.658784994962558),
np.float64(5.928250947103633)] y_points = [1.          +0.j
0.998248794396142 +0.04300573761836035j
0.9939807807384984 +0.09379950015840044j
0.9848111513956845 +0.13446443028617683j
0.9743479179133374 +0.18214298285754515j
0.9601886726037523 +0.22317751416804543j
0.9431166179731776 +0.26055123376394795j
0.9238797564152206 +0.3034161709317469j
0.9009644830863459 +0.33991868773980083j
0.8756468020697665 +0.3761220035904116j
0.84962511880038  +0.412017318455419j
0.818745819986624 +0.442280615297969j
0.7871625189200606 +0.47112710760674426j
0.751364004364814 +0.49471998310394594j
0.7194815023408074 +0.5259160829314653j
0.6872997993593579 +0.5446865429969376j
0.6441532612904362 +0.5595321905030095j
0.6115579569854623 +0.5776250484001548j
0.574025836882678 +0.5901914886127635j
0.5357369143581259 +0.598041113731564j
0.49762399239677557+0.606145939667007j
0.46230947939033395+0.6076243443979021j
0.42619416382132425+0.6073955436657397j ]
fit1: [ 0.6195921641669933 -0.2581305170169822]
[ 0.38722320269411353 -0.320634797157068  0.468258368016752
-0.0916045907665414 ] 3.006488421477414e-09
[ 0.3590750478980125 -0.33393987004236225  0.37837421515205205
-0.10227420317760519 -0.03911167302914932] 1.0247396998744547e-09
E_gs: -0.33393987004236225
test mps sampling took: (0.0012984275817871094, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.29747776356375377

```

```

1 Execution time: 0:01:28.860956  ovlp:
(0.9980304+0.0527903999999999904j)
2 Execution time: 0:01:28.862863  ovlp: (0.9922688+0.0989312j)
3 Execution time: 0:01:28.865355  ovlp:
(0.98218239999999999+0.14945279999999994j)
4 Execution time: 0:01:28.869047  ovlp:
(0.9685328+0.196752000000000004j)
x_points = [np.float64(0.0), np.float64(0.29747776356375377),
np.float64(0.5949555271275075), np.float64(0.8924332906912613),
np.float64(1.189911054255015)] y_points = [1.          +0.j
0.9980304      +0.05279039999999999j
0.9922688      +0.0989312j
0.98218239999999999+0.14945279999999994j
0.9685328      +0.196752000000000004j]
fit1: [ 0.5876077796917146 -0.28661568928684245]
[ 0.5876077796917146 -0.28661568928684245  0.4123922203082854
-0.          ] 4.845260927904306e-11
[ 5.1524947409580557e-01 -2.5589664541670620e-01
3.6415858788967825e-01
-1.0146926920636211e-01  1.0526847994544731e-06]
4.763815258131261e-10
E_gs: -0.2558966454167062
test mps sampling took: (0.0012960433959960938, Counter({0: 5, 2: 5}))
truncated ham size: 10  Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172  dt: 0.19508508491598414
1 Execution time: 0:01:29.499215  ovlp:
(0.9990879990879991+0.030675030675030746j)
2 Execution time: 0:01:29.501125  ovlp:
(0.9964359964359963+0.06647706647706642j)
3 Execution time: 0:01:29.503586  ovlp:
(0.9923559923559924+0.09777909777909777j)
4 Execution time: 0:01:29.506696  ovlp:
(0.986043986043986+0.12953712953712948j)
5 Execution time: 0:01:29.510457  ovlp:
(0.9790179790179789+0.16079716079716078j)
6 Execution time: 0:01:29.514674  ovlp:
(0.9692259692259693+0.1955011955011956j)
7 Execution time: 0:01:29.519508  ovlp:
(0.9595659595659596+0.22195522195522188j)
8 Execution time: 0:01:29.524922  ovlp:
(0.9481659481659481+0.2546792546792547j)
9 Execution time: 0:01:29.530976  ovlp:
(0.9332559332559331+0.28442128442128434j)
10 Execution time: 0:01:29.537599  ovlp:
(0.9171099171099171+0.3121833121833122j)

```



```

11 Execution time: 0:01:29.546162 ovlp:
(0.9005259005259005+0.33851733851733856j)
12 Execution time: 0:01:29.554671 ovlp:
(0.8834918834918835+0.36464136464136465j)
13 Execution time: 0:01:29.565028 ovlp:
(0.8653958653958653+0.39043539043539033j)
14 Execution time: 0:01:29.576399 ovlp:
(0.8451278451278452+0.4160734160734161j)
15 Execution time: 0:01:29.587504 ovlp:
(0.8231978231978232+0.4379734379734379j)
x_points = [np.float64(0.0), np.float64(0.19508508491598414),
np.float64(0.3901701698319683), np.float64(0.5852552547479524),
np.float64(0.7803403396639366), np.float64(0.9754254245799208),
np.float64(1.1705105094959047), np.float64(1.365595594411889),
np.float64(1.5606806793278731), np.float64(1.7557657642438573),
np.float64(1.9508508491598415), np.float64(2.1459359340758257),
np.float64(2.3410210189918095), np.float64(2.5361061039077937),
np.float64(2.731191188823778), np.float64(2.926276273739762)] y_points =
[1.          +0.j
0.9990879990879991+0.03067503067503075j
0.9964359964359963+0.06647706647706642j
0.9923559923559924+0.09777909777909777j
0.986043986043986 +0.12953712953712948j
0.9790179790179789+0.16079716079716078j
0.9692259692259693+0.1955011955011956j
0.9595659595659596+0.22195522195522188j
0.9481659481659481+0.2546792546792547j
0.9332559332559331+0.28442128442128434j
0.9171099171099171+0.3121833121833122j
0.9005259005259005+0.33851733851733856j
0.8834918834918835+0.36464136464136465j
0.8653958653958653+0.39043539043539033j
0.8451278451278452+0.4160734160734161j
0.8231978231978232+0.4379734379734379j ]
fit1: [ 0.6340852740276722 -0.2626770652047059]
[ 0.6340852740276722 -0.2626770652047059  0.36591472597232777
-0.          ] 2.005155832440207e-10
[ 5.2589726037835416e-01 -2.8693481537318921e-01
3.1689089116976721e-01
-5.2115429594386566e-02  8.4103828059645066e-07]
8.323077523182587e-11
E_gs: -0.2869348153731892
test mps sampling took: (0.0013110637664794922, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.11839696500707746

```

```

1 Execution time: 0:01:29.985763  ovlp:
(0.9997119997119996+0.020529020529020503j)
2 Execution time: 0:01:29.987697  ovlp:
(0.9988239988239989+0.039015039015039j)
3 Execution time: 0:01:29.990700  ovlp:
(0.9974379974379974+0.06041706041706041j)
4 Execution time: 0:01:29.993995  ovlp:
(0.9951879951879952+0.07946707946707954j)
5 Execution time: 0:01:29.997866  ovlp:
(0.9924159924159923+0.09828909828909826j)
6 Execution time: 0:01:30.003037  ovlp:
(0.9885099885099886+0.11761511761511767j)
7 Execution time: 0:01:30.008498  ovlp:
(0.9847719847719847+0.13960513960513965j)
8 Execution time: 0:01:30.015424  ovlp:
(0.9807699807699808+0.15929715929715926j)
9 Execution time: 0:01:30.021965  ovlp:
(0.9746739746739748+0.17627117627117617j)
10 Execution time: 0:01:30.028678  ovlp:
(0.9683319683319684+0.19401319401319395j)
11 Execution time: 0:01:30.035895  ovlp:
(0.9613599613599613+0.21256521256521266j)
12 Execution time: 0:01:30.044134  ovlp:
(0.9568359568359568+0.23118923118923118j)
13 Execution time: 0:01:30.052899  ovlp:
(0.9482439482439482+0.2502572502572502j)
14 Execution time: 0:01:30.062894  ovlp:
(0.9402039402039402+0.2698832698832698j)
15 Execution time: 0:01:30.074015  ovlp:
(0.9323559323559323+0.28712128712128715j)
x_points = [np.float64(0.0), np.float64(0.11839696500707746),
np.float64(0.2367939300141549), np.float64(0.35519089502123236),
np.float64(0.4735878600283098), np.float64(0.5919848250353873),
np.float64(0.7103817900424647), np.float64(0.8287787550495422),
np.float64(0.9471757200566197), np.float64(1.065572685063697),
np.float64(1.1839696500707746), np.float64(1.3023666150778521),
np.float64(1.4207635800849294), np.float64(1.539160545092007),
np.float64(1.6575575100990845), np.float64(1.7759544751061618)] y_points
= [1.          +0.j
0.9997119997119996+0.0205290205290205j
0.9988239988239989+0.039015039015039j
0.9974379974379974+0.06041706041706041j
0.9951879951879952+0.07946707946707954j
0.9924159924159923+0.09828909828909826j
0.9885099885099886+0.11761511761511767j
0.9847719847719847+0.13960513960513965j
0.9807699807699808+0.15929715929715926j

```

0.9746739746739748+0.17627117627117617j
0.9683319683319684+0.19401319401319395j
0.9613599613599613+0.21256521256521266j
0.9568359568359568+0.23118923118923118j
0.9482439482439482+0.2502572502572502j
0.9402039402039402+0.2698832698832698j
0.9323559323559323+0.28712128712128715j]
fit1: [0.6232525489210913 -0.26920186173615845]
[0.6232525489210913 -0.26920186173615845 0.3767474510789087
-0.] 5.6577410882987694e-11
[5.2675986748322079e-01 -2.8275828075271908e-01
2.9286379155471315e-01
-6.4013978392930285e-02 3.8253838092265880e-06]
6.071279318553403e-11
E_gs: -0.2827582807527191
test mps sampling took: (0.001312255859375, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.19089131642544124
1 Execution time: 0:01:30.461769 ovlp:
(0.9991259970283899+0.03195430864464943j)
2 Execution time: 0:01:30.463783 ovlp:
(0.9965875883978006+0.06769723017058249j)
3 Execution time: 0:01:30.467048 ovlp:
(0.9928939758395179+0.09611372678667118j)
4 Execution time: 0:01:30.471005 ovlp:
(0.9869507556325692+0.12838343650368422j)
5 Execution time: 0:01:30.475188 ovlp:
(0.9792063293015196+0.15722553456681743j)
6 Execution time: 0:01:30.480234 ovlp:
(0.9708083007482224+0.18821843994269583j)
7 Execution time: 0:01:30.485967 ovlp:
(0.9602138647271401+0.222585756791573j)
8 Execution time: 0:01:30.492331 ovlp:
(0.9494218280342153+0.2507970527099792j)
9 Execution time: 0:01:30.499970 ovlp:
(0.935027379093089+0.2769639416774017j)
10 Execution time: 0:01:30.507992 ovlp:
(0.9222137355267008+0.3096896529448201j)
11 Execution time: 0:01:30.516580 ovlp:
(0.9053644782392261+0.3373461469768997j)
12 Execution time: 0:01:30.525801 ovlp:
(0.8884620207708707+0.3613698286574174j)
13 Execution time: 0:01:30.534842 ovlp:
(0.8706399601758645+0.3820190988649361j)
14 Execution time: 0:01:30.544700 ovlp:

```

(0.8515866953947644+0.4073727850674693j)
15 Execution time: 0:01:30.554613  ovlp:
(0.8289082182879421+0.43170806780743054j)
16 Execution time: 0:01:30.565353  ovlp:
(0.8077269462716172+0.4521445372914268j)
17 Execution time: 0:01:30.577551  ovlp:
(0.7848280684154325+0.4729686080932676j)
18 Execution time: 0:01:30.590207  ovlp:
(0.7631071945644614+0.49237907408885184j)
19 Execution time: 0:01:30.604758  ovlp:
(0.7354583005582218+0.5099807339344953j)
x_points = [np.float64(0.0), np.float64(0.19089131642544124),
np.float64(0.3817826328508825), np.float64(0.5726739492763238),
np.float64(0.763565265701765), np.float64(0.9544565821272062),
np.float64(1.1453478985526475), np.float64(1.3362392149780886),
np.float64(1.52713053140353), np.float64(1.7180218478289713),
np.float64(1.9089131642544124), np.float64(2.0998044806798535),
np.float64(2.290695797105295), np.float64(2.481587113530736),
np.float64(2.6724784299561772), np.float64(2.863369746381619),
np.float64(3.05426106280706), np.float64(3.245152379232501),
np.float64(3.4360436956579425), np.float64(3.6269350120833836)]
y_points = [1.          +0.j
0.9991259970283899+0.03195430864464943j
0.9965875883978006+0.06769723017058249j
0.9928939758395179+0.09611372678667118j
0.9869507556325692+0.12838343650368422j
0.9792063293015196+0.15722553456681743j
0.9708083007482224+0.18821843994269583j
0.9602138647271401+0.222585756791573j
0.9494218280342153+0.2507970527099792j
0.935027379093089 +0.2769639416774017j
0.9222137355267008+0.3096896529448201j
0.9053644782392261+0.3373461469768997j
0.8884620207708707+0.3613698286574174j
0.8706399601758645+0.3820190988649361j
0.8515866953947644+0.4073727850674693j
0.8289082182879421+0.43170806780743054j
0.8077269462716172+0.4521445372914268j
0.7848280684154325+0.4729686080932676j
0.7631071945644614+0.49237907408885184j
0.7354583005582218+0.5099807339344953j ]
fit1: [ 0.6315802225162  -0.2630035592270618]
[ 0.5372878464737949 -0.2842711041027336  0.3721573326527326
-0.03918453593064175] 1.053800664165511e-09
[ 0.5084006505358711 -0.29070978715267815  0.30051359413668755
-0.06070792555335898 -0.00803350186295878] 8.511402467426365e-10
E_gs: -0.29070978715267815

```

test mps sampling took: (0.0013523101806640625, Counter({2: 6, 0: 4}))

truncated ham size: 10 Number of fitting points: 20

shots per matrix element: 263157.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.018926710862937568

1 Execution time: 0:01:31.096689 ovlp:

(0.99999239997416+0.0041914142508083785j)

2 Execution time: 0:01:31.098691 ovlp:

(0.9999619998707996+0.006463821976994799j)

3 Execution time: 0:01:31.101130 ovlp:

(0.9999239997415992+0.012642642984986185j)

4 Execution time: 0:01:31.104154 ovlp:

(0.9998631995348783+0.014405848979886615j)

5 Execution time: 0:01:31.107939 ovlp:

(0.9997947993023177+0.012703443191706798j)

6 Execution time: 0:01:31.112261 ovlp:

(0.9997871992764775+0.017423059238401484j)

7 Execution time: 0:01:31.117152 ovlp:

(0.999566798527115+0.02411108197767864j)

8 Execution time: 0:01:31.122710 ovlp:

(0.9994147980103132+0.023199078876868118j)

9 Execution time: 0:01:31.128747 ovlp:

(0.9993311977260724+0.03238751011753438j)

10 Execution time: 0:01:31.135382 ovlp:

(0.9992095973126309+0.0332539130633045j)

11 Execution time: 0:01:31.142627 ovlp:

(0.9990651968216693+0.03713752626758926j)

12 Execution time: 0:01:31.151705 ovlp:

(0.9988523960981468+0.03733512693943153j)

13 Execution time: 0:01:31.161863 ovlp:

(0.9985787951679035+0.041872342365964155j)

14 Execution time: 0:01:31.171201 ovlp:

(0.9986243953229441+0.045261953890643136j)

15 Execution time: 0:01:31.181288 ovlp:

(0.9980999935399781+0.04931276766340997j)

16 Execution time: 0:01:31.192415 ovlp:

(0.9980087932298969+0.05172197585471783j)

17 Execution time: 0:01:31.206207 ovlp:

(0.9975071915244511+0.059610802676729024j)

18 Execution time: 0:01:31.218738 ovlp:

(0.9974995914986111+0.058394798542314996j)

19 Execution time: 0:01:31.234073 ovlp:

(0.9972791907492486+0.06268121311612451j)

x_points = [np.float64(0.0), np.float64(0.018926710862937568),

np.float64(0.037853421725875136), np.float64(0.056780132588812704),

np.float64(0.07570684345175027), np.float64(0.09463355431468784),

np.float64(0.11356026517762541), np.float64(0.13248697604056298),

```

np.float64(0.15141368690350054), np.float64(0.1703403977664381),
np.float64(0.18926710862937568), np.float64(0.20819381949231325),
np.float64(0.22712053035525082), np.float64(0.24604724121818838),
np.float64(0.26497395208112595), np.float64(0.2839006629440635),
np.float64(0.3028273738070011), np.float64(0.32175408466993866),
np.float64(0.3406807955328762), np.float64(0.3596075063958138)]
y_points = [1.          +0.j
0.99999239997416 +0.00419141425080838j
0.9999619998707996+0.0064638219769948j
0.9999239997415992+0.01264264298498619j
0.9998631995348783+0.01440584897988662j
0.9997947993023177+0.0127034431917068j
0.9997871992764775+0.01742305923840148j
0.999566798527115 +0.02411108197767864j
0.9994147980103132+0.02319907887686812j
0.9993311977260724+0.03238751011753438j
0.9992095973126309+0.0332539130633045j
0.9990651968216693+0.03713752626758926j
0.9988523960981468+0.03733512693943153j
0.9985787951679035+0.04187234236596415j
0.9986243953229441+0.04526195389064314j
0.9980999935399781+0.04931276766340997j
0.9980087932298969+0.05172197585471783j
0.9975071915244511+0.05961080267672902j
0.9974995914986111+0.058394798542315j
0.9972791907492486+0.06268121311612451j]
fit1: [ 0.5920736813239623 -0.29640798153373227]
[ 0.5920736813239623 -0.29640798153373227 0.4079263186760377
-0.          ] 3.2769260233827424e-10
[ 5.2972093285382882e-01 -2.5421885408540557e-01
3.7252123937828835e-01
-1.0864742985685095e-01 6.8401621670617697e-07]
3.2545303244850383e-10
E_gs: -0.25421885408540557
test mps sampling took: (0.0013740062713623047, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1943470286921209
1 Execution time: 0:01:31.917118 ovlp:
(0.9991680000000001+0.032051199999999994j)
2 Execution time: 0:01:31.919100 ovlp:
(0.9964736000000001+0.06661760000000005j)
3 Execution time: 0:01:31.921857 ovlp:
(0.9924096+0.09697920000000004j)
4 Execution time: 0:01:31.925639 ovlp:
(0.9865024+0.12960639999999999j)

```

```

5 Execution time: 0:01:31.929396  ovlp:
(0.9790656+0.164499200000000007j)
6 Execution time: 0:01:31.934794  ovlp:
(0.970560000000000001+0.192633599999999996j)
7 Execution time: 0:01:31.939901  ovlp:
(0.95970559999999999+0.22444799999999998j)
8 Execution time: 0:01:31.946365  ovlp: (0.948576000000000001+0.2515904j)
9 Execution time: 0:01:31.954110  ovlp: (0.933184+0.28290560000000001j)
10 Execution time: 0:01:31.961422  ovlp:
(0.91899519999999999+0.312300800000000005j)
11 Execution time: 0:01:31.968728  ovlp:
(0.9012928+0.338246400000000006j)
12 Execution time: 0:01:31.977680  ovlp: (0.883673600000000001+0.364096j)
13 Execution time: 0:01:31.987667  ovlp:
(0.8664448+0.391545599999999994j)
14 Execution time: 0:01:31.997141  ovlp:
(0.84495999999999999+0.415302400000000007j)
15 Execution time: 0:01:32.007285  ovlp:
(0.8231936+0.438073600000000006j)
16 Execution time: 0:01:32.018420  ovlp:
(0.8020224+0.460544000000000006j)
x_points = [np.float64(0.0), np.float64(0.1943470286921209),
np.float64(0.3886940573842418), np.float64(0.5830410860763626),
np.float64(0.7773881147684836), np.float64(0.9717351434606045),
np.float64(1.1660821721527252), np.float64(1.3604292008448462),
np.float64(1.5547762295369671), np.float64(1.749123258229088),
np.float64(1.943470286921209), np.float64(2.1378173156133298),
np.float64(2.3321643443054505), np.float64(2.5265113729975717),
np.float64(2.7208584016896924), np.float64(2.9152054303818136),
np.float64(3.1095524590739343)] y_points = [1.          +0.j
0.999168000000000001+0.032051199999999995j
0.996473600000000001+0.066617600000000005j
0.9924096          +0.096979200000000004j
0.9865024          +0.12960639999999999j
0.9790656          +0.164499200000000007j
0.970560000000000001+0.192633599999999996j
0.95970559999999999+0.22444799999999998j
0.948576000000000001+0.2515904j
0.933184          +0.282905600000000001j
0.91899519999999999+0.312300800000000005j
0.9012928          +0.338246400000000006j
0.883673600000000001+0.364096j
0.8664448          +0.391545599999999994j
0.84495999999999999+0.415302400000000007j
0.8231936          +0.438073600000000006j
0.8020224          +0.460544000000000006j]
fit1: [ 0.6360250887590073 -0.2622361446423894]

```

```

[ 0.6360250887590073 -0.2622361446423894 0.3639749112409927
 -0.          ] 2.593663273876414e-10
[ 5.3007979414992934e-01 -2.8494360223092591e-01
 2.6898619192460949e-01
 -6.1871421425755045e-02 3.6695776967359420e-06]
1.0610873441451824e-10
E_gs: -0.2849436022309259
test mps sampling took: (0.0013394355773925781, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.08941864116480042
1 Execution time: 0:01:32.398366 ovlp:
(0.9998559999423999+0.015627606251042536j)
2 Execution time: 0:01:32.400563 ovlp:
(0.9993135997254399+0.03121081248432489j)
3 Execution time: 0:01:32.403558 ovlp:
(0.9983847993539197+0.046203618481447384j)
4 Execution time: 0:01:32.407348 ovlp:
(0.9971439988575996+0.06173882469552994j)
5 Execution time: 0:01:32.411475 ovlp:
(0.9956607982643193+0.07602363040945215j)
6 Execution time: 0:01:32.416744 ovlp:
(0.993745597498239+0.0902220360888144j)
x_points = [np.float64(0.0), np.float64(0.08941864116480042),
np.float64(0.17883728232960083), np.float64(0.26825592349440125),
np.float64(0.35767456465920167), np.float64(0.4470932058240021),
np.float64(0.5365118469888025)] y_points = [1.          +0.j
0.9998559999423999+0.01562760625104254j
0.9993135997254399+0.03121081248432489j
0.9983847993539197+0.04620361848144738j
0.9971439988575996+0.06173882469552994j
0.9956607982643193+0.07602363040945215j
0.993745597498239 +0.0902220360888144j ]
fit1: [ 0.590742227836274 -0.2953047752508024]
[ 0.590742227836274 -0.2953047752508024 0.40925777216372605
 -0.          ] 5.89498505929814e-11
[ 5.2733982825003911e-01 -2.5217863174403027e-01
 3.7329524820261734e-01
 -1.1058232176423148e-01 6.8323166412767027e-07]
5.442683090230418e-11
E_gs: -0.25217863174403027
test mps sampling took: (0.0013685226440429688, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.22814676580584023

```



```

1 Execution time: 0:01:33.127837 ovlp:
(0.9987231969356727+0.03514568434964249j)
2 Execution time: 0:01:33.129810 ovlp:
(0.995295988710373+0.07818178763629025j)
3 Execution time: 0:01:33.132369 ovlp:
(0.9894551746924192+0.11720828129987515j)
4 Execution time: 0:01:33.135516 ovlp:
(0.9806183534840485+0.15174356418455415j)
5 Execution time: 0:01:33.139151 ovlp:
(0.9709527302865526+0.1888660532785278j)
6 Execution time: 0:01:33.143345 ovlp:
(0.9586831008394421+0.2257981419155406j)
7 Execution time: 0:01:33.148153 ovlp:
(0.943574264578235+0.2605742253781409j)
8 Execution time: 0:01:33.154394 ovlp:
(0.9276870264488635+0.2947623074295378j)
9 Execution time: 0:01:33.161219 ovlp:
(0.9092797822714775+0.32556238134971527j)
10 Execution time: 0:01:33.168258 ovlp:
(0.8911413387392131+0.3574096577831787j)
11 Execution time: 0:01:33.177516 ovlp:
(0.8678396828152388+0.388198531676476j)
12 Execution time: 0:01:33.187481 ovlp:
(0.8420908210179705+0.4171282011076827j)
13 Execution time: 0:01:33.198756 ovlp:
(0.8193267663842394+0.4399706559295742j)
14 Execution time: 0:01:33.209388 ovlp:
(0.7918363004071209+0.4717395321748772j)
x_points = [np.float64(0.0), np.float64(0.22814676580584023),
np.float64(0.45629353161168046), np.float64(0.6844402974175207),
np.float64(0.9125870632233609), np.float64(1.140733829029201),
np.float64(1.3688805948350413), np.float64(1.5970273606408816),
np.float64(1.8251741264467218), np.float64(2.053320892252562),
np.float64(2.281467658058402), np.float64(2.5096144238642424),
np.float64(2.7377611896700826), np.float64(2.965907955475923),
np.float64(3.194054721281763)] y_points = [1.          +0.j
0.9987231969356727+0.03514568434964249j
0.995295988710373 +0.07818178763629025j
0.9894551746924192+0.11720828129987515j
0.9806183534840485+0.15174356418455415j
0.9709527302865526+0.1888660532785278j
0.9586831008394421+0.2257981419155406j
0.943574264578235 +0.2605742253781409j
0.9276870264488635+0.2947623074295378j
0.9092797822714775+0.32556238134971527j
0.8911413387392131+0.3574096577831787j
0.8678396828152388+0.388198531676476j

```

0.8420908210179705+0.4171282011076827j
0.8193267663842394+0.4399706559295742j
0.7918363004071209+0.4717395321748772j]
fit1: [0.6320214075427422 -0.2628023584840249]
[0.6320214075427422 -0.2628023584840249 0.36797859245725784
-0.] 6.63572042719106e-10
[5.2011581598381040e-01 -2.8607152316095152e-01
2.5470817381302174e-01
-7.1286583805454745e-02 1.1232956363999687e-06]
3.4942388432894565e-10
E_gs: -0.2860715231609515
test mps sampling took: (0.0013110637664794922, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2154723152054132
1 Execution time: 0:01:33.603057 ovlp:
(0.998912+0.03545599999999993j)
2 Execution time: 0:01:33.605007 ovlp:
(0.9960127999999999+0.07608320000000002j)
3 Execution time: 0:01:33.607521 ovlp:
(0.9908927999999999+0.10830080000000009j)
4 Execution time: 0:01:33.610659 ovlp:
(0.9833664+0.14447999999999994j)
5 Execution time: 0:01:33.614430 ovlp:
(0.9738304+0.17743360000000008j)
6 Execution time: 0:01:33.618663 ovlp:
(0.9640063999999999+0.21634559999999992j)
7 Execution time: 0:01:33.623634 ovlp:
(0.9500736000000001+0.24496000000000007j)
8 Execution time: 0:01:33.629247 ovlp: (0.9346752+0.2773312000000001j)
9 Execution time: 0:01:33.635297 ovlp: (0.9174656000000001+0.3090176j)
10 Execution time: 0:01:33.642052 ovlp:
(0.9016896000000001+0.33972479999999994j)
11 Execution time: 0:01:33.650638 ovlp:
(0.8798912000000001+0.3706944000000001j)
12 Execution time: 0:01:33.658865 ovlp:
(0.8590464+0.39707519999999996j)
13 Execution time: 0:01:33.668603 ovlp: (0.8363072+0.4230912j)
14 Execution time: 0:01:33.679226 ovlp:
(0.8125952000000001+0.4504064000000001j)
15 Execution time: 0:01:33.690759 ovlp:
(0.7868544+0.47282559999999996j)
16 Execution time: 0:01:33.703419 ovlp: (0.7606016+0.493792j)
x_points = [np.float64(0.0), np.float64(0.2154723152054132),
np.float64(0.4309446304108264), np.float64(0.6464169456162396),
np.float64(0.8618892608216528), np.float64(1.077361576027066),

```

np.float64(1.2928338912324793), np.float64(1.5083062064378925),
np.float64(1.7237785216433057), np.float64(1.939250836848719),
np.float64(2.154723152054132), np.float64(2.3701954672595456),
np.float64(2.5856677824649585), np.float64(2.8011400976703715),
np.float64(3.016612412875785), np.float64(3.2320847280811984),
np.float64(3.4475570432866114)] y_points = [1.          +0.j
0.998912          +0.035455999999999993j
0.9960127999999999+0.076083200000000002j
0.9908927999999999+0.108300800000000009j
0.9833664          +0.144479999999999994j
0.9738304          +0.177433600000000008j
0.9640063999999999+0.216345599999999992j
0.9500736000000000+0.244960000000000007j
0.9346752          +0.27733120000000001j
0.9174656000000000+0.3090176j
0.9016896000000000+0.339724799999999994j
0.8798912000000000+0.37069440000000001j
0.8590464          +0.397075199999999996j
0.8363072          +0.4230912j
0.8125952000000000+0.45040640000000001j
0.7868544          +0.472825599999999996j
0.7606016          +0.493792j          ]
fit1: [ 0.6326489397871353 -0.2625560813350656]
[ 0.6326489397871353 -0.2625560813350656  0.3673510602128647
-0.          ] 1.065966929956669e-09
[ 5.2598614770292318e-01 -2.8579420593828869e-01
2.7309637443179058e-01
-6.2067710186898467e-02  1.7304896255425572e-06]
4.4664774598357616e-10
E_gs: -0.2857942059382887
test mps sampling took: (0.0013430118560791016, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.287084619056028
1 Execution time: 0:01:34.065114 ovlp:
(0.9982383992953596+0.04983721993488799j)
2 Execution time: 0:01:34.067048 ovlp:
(0.9925407970163187+0.09692763877105559j)
3 Execution time: 0:01:34.070255 ovlp:
(0.9835143934057573+0.143734857493943j)
4 Execution time: 0:01:34.073636 ovlp:
(0.9710415884166355+0.19047247618899044j)
5 Execution time: 0:01:34.077486 ovlp:
(0.9554223821689529+0.23680689472275795j)
6 Execution time: 0:01:34.081974 ovlp:
(0.9353847741539096+0.2811133124453249j)

```

```

x_points = [np.float64(0.0), np.float64(0.287084619056028),
np.float64(0.574169238112056), np.float64(0.861253857168084),
np.float64(1.148338476224112), np.float64(1.43542309528014),
np.float64(1.722507714336168)] y_points = [1.          +0.j
0.9982383992953596+0.04983721993488799j
0.9925407970163187+0.09692763877105559j
0.9835143934057573+0.143734857493943j
0.9710415884166355+0.19047247618899044j
0.9554223821689529+0.23680689472275795j
0.9353847741539096+0.2811133124453249j ]
fit1: [ 0.6108898484518331 -0.2762006453423368]
[ 0.6108898484518331 -0.2762006453423368  0.38911015154816686
-0.          ] 1.167485007514565e-10
[ 5.2446131691305564e-01 -2.8049868623304169e-01
3.4177016592901638e-01
-6.4472707940762791e-02  1.0545141456944582e-06]
2.462517046153181e-11
E_gs: -0.2804986862330417
test mps sampling took: (0.0012669563293457031, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.09214664506791927
1 Execution time: 0:01:34.645565 ovlp:
(0.9997983996774396+0.015849625359400488j)
2 Execution time: 0:01:34.647533 ovlp:
(0.9990735985177577+0.03309125294600479j)
3 Execution time: 0:01:34.650029 ovlp:
(0.9982671972275157+0.04544647271435642j)
4 Execution time: 0:01:34.653121 ovlp:
(0.9970911953459125+0.062203299525279254j)
5 Execution time: 0:01:34.656871 ovlp:
(0.995305592488948+0.07574892119827381j)
6 Execution time: 0:01:34.661153 ovlp:
(0.9932223891558227+0.09340334944535922j)
7 Execution time: 0:01:34.665971 ovlp:
(0.9908175853081365+0.11005937609500172j)
8 Execution time: 0:01:34.671269 ovlp:
(0.98822558116093+0.12163699461919131j)
9 Execution time: 0:01:34.677390 ovlp:
(0.9846063753702006+0.13752022003235198j)
10 Execution time: 0:01:34.684137 ovlp:
(0.9808767694028311+0.15517464827943717j)
11 Execution time: 0:01:34.692475 ovlp:
(0.9774159638655422+0.16804826887723023j)
12 Execution time: 0:01:34.702189 ovlp:
(0.9731199569919311+0.18536189657903446j)

```

```

x_points = [np.float64(0.0), np.float64(0.09214664506791927),
np.float64(0.18429329013583853), np.float64(0.2764399352037578),
np.float64(0.36858658027167707), np.float64(0.4607332253395963),
np.float64(0.5528798704075156), np.float64(0.6450265154754349),
np.float64(0.7371731605433541), np.float64(0.8293198056112734),
np.float64(0.9214664506791926), np.float64(1.013613095747112),
np.float64(1.1057597408150313)] y_points = [1.          +0.j
0.9997983996774396+0.01584962535940049j
0.9990735985177577+0.03309125294600479j
0.9982671972275157+0.04544647271435642j
0.9970911953459125+0.06220329952527925j
0.995305592488948 +0.07574892119827381j
0.9932223891558227+0.09340334944535922j
0.9908175853081365+0.11005937609500172j
0.98822558116093 +0.12163699461919131j
0.9846063753702006+0.13752022003235198j
0.9808767694028311+0.15517464827943717j
0.9774159638655422+0.16804826887723023j
0.9731199569919311+0.18536189657903446j]
fit1: [ 0.6167955974193756 -0.2732527490773595]
[ 0.6167955974193756 -0.2732527490773595  0.3832044025806244
 -0.          ] 4.1764879920473156e-11
[ 5.4130883239584082e-01 -2.6464025753093462e-01
 3.2695533803594906e-01
 -7.9933248331108070e-02  1.7796439125135679e-06]
1.4261319253974816e-10
E_gs: -0.2646402575309346
test mps sampling took: (0.0013663768768310547, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.03841145335511017
1 Execution time: 0:01:35.249394 ovlp:
(0.9999792000000001+0.00428800000000000695j)
2 Execution time: 0:01:35.251356 ovlp:
(0.9998880000000001+0.014051199999999993j)
3 Execution time: 0:01:35.254148 ovlp:
(0.9997024000000001+0.019919999999999938j)
4 Execution time: 0:01:35.257874 ovlp:
(0.9994320000000001+0.0252448000000000067j)
x_points = [np.float64(0.0), np.float64(0.03841145335511017),
np.float64(0.07682290671022034), np.float64(0.1152343600653305),
np.float64(0.15364581342044067)] y_points = [1.          +0.j
0.9999792000000001+0.004288000000000007j
0.9998880000000001+0.014051199999999993j
0.9997024000000001+0.019919999999999994j
0.9994320000000001+0.025244800000000007j]

```

```

fit1: [ 0.09738653661863562 -1.721829387655125 ]
[ 0.09738653661863562 -1.721829387655125 0.09739653651863563
-0.          ] 4.971885875467671e-11
[ 8.6992264152201820e-02 -1.5382082919509563e+00
8.6998988249441883e-02
-6.3572336525148310e-01 1.0671360920685950e-06]
2.1602800443035228e-10
E_gs: -1.5382082919509563
test mps sampling took: (0.005385637283325195, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1174357436608029
1 Execution time: 0:01:35.476369 ovlp:
(0.9997503999999999+0.021344000000000003j)
2 Execution time: 0:01:35.478651 ovlp:
(0.9986368000000001+0.039443200000000001j)
3 Execution time: 0:01:35.481423 ovlp:
(0.9970943999999999+0.056268800000000001j)
4 Execution time: 0:01:35.484770 ovlp:
(0.9951488+0.078527999999999993j)
5 Execution time: 0:01:35.489236 ovlp: (0.9920831999999999+0.1017728j)
6 Execution time: 0:01:35.493687 ovlp:
(0.9883968000000001+0.120601600000000009j)
7 Execution time: 0:01:35.499179 ovlp:
(0.9845824000000001+0.136179199999999994j)
8 Execution time: 0:01:35.507437 ovlp: (0.9807104+0.154528j)
9 Execution time: 0:01:35.518325 ovlp: (0.9757696+0.177408j)
10 Execution time: 0:01:35.527742 ovlp:
(0.969408+0.193926400000000005j)
11 Execution time: 0:01:35.535991 ovlp:
(0.9633792000000001+0.211967999999999993j)
12 Execution time: 0:01:35.544411 ovlp:
(0.9562496+0.232646399999999992j)
13 Execution time: 0:01:35.558504 ovlp:
(0.9483520000000001+0.2509504j)
14 Execution time: 0:01:35.571202 ovlp:
(0.9413568000000001+0.26599679999999999j)
15 Execution time: 0:01:35.585707 ovlp:
(0.9335104000000001+0.284224000000000003j)
16 Execution time: 0:01:35.597659 ovlp:
(0.9230016000000001+0.30406399999999999j)
x_points = [np.float64(0.0), np.float64(0.1174357436608029),
np.float64(0.2348714873216058), np.float64(0.3523072309824087),
np.float64(0.4697429746432116), np.float64(0.5871787183040145),
np.float64(0.7046144619648174), np.float64(0.8220502056256203),
np.float64(0.9394859492864231), np.float64(1.056921692947226),

```

```

np.float64(1.174357436608029), np.float64(1.2917931802688318),
np.float64(1.4092289239296347), np.float64(1.5266646675904376),
np.float64(1.6441004112512405), np.float64(1.7615361549120434),
np.float64(1.8789718985728463)] y_points = [1.          +0.j
0.9997503999999999+0.021344000000000003j
0.99863680000000001+0.039443200000000001j
0.9970943999999999+0.056268800000000001j
0.9951488          +0.078527999999999993j
0.9920831999999999+0.1017728j
0.98839680000000001+0.120601600000000009j
0.98458240000000001+0.136179199999999994j
0.9807104          +0.154528j
0.9757696          +0.177408j
0.969408           +0.193926400000000005j
0.96337920000000001+0.211967999999999993j
0.9562496          +0.232646399999999992j
0.94835200000000001+0.2509504j
0.94135680000000001+0.26599679999999999j
0.93351040000000001+0.284224000000000003j
0.92300160000000001+0.30406399999999999j ]
fit1: [ 0.6285266315633944 -0.26778804242141363]
[ 0.6285266315633944 -0.26778804242141363  0.3714733684366056
-0.          ] 1.8927309602060482e-10
[ 5.1431645420504990e-01 -2.8880877127710369e-01
2.9397330893440210e-01
-6.8037454627329630e-02  2.7588204175419893e-06]
1.5625284608325594e-10
E_gs: -0.2888087712771037
test mps sampling took: (0.001321554183959961, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.06914771763024745
1 Execution time: 0:01:36.043829 ovlp:
(0.99988479995392+0.013026005210402092j)
2 Execution time: 0:01:36.045797 ovlp:
(0.99958479983392+0.022839609135843597j)
3 Execution time: 0:01:36.048355 ovlp:
(0.9990639996255999+0.034561213824485515j)
4 Execution time: 0:01:36.051485 ovlp:
(0.9983151993260797+0.04599001839600736j)
5 Execution time: 0:01:36.055197 ovlp:
(0.9973335989334395+0.05774762309904924j)
6 Execution time: 0:01:36.059451 ovlp:
(0.9961335984534394+0.06765962706385076j)
x_points = [np.float64(0.0), np.float64(0.06914771763024745),
np.float64(0.1382954352604949), np.float64(0.20744315289074233),

```

```

np.float64(0.2765908705209898), np.float64(0.34573858815123726),
np.float64(0.41488630578148467)] y_points = [1.          +0.j
0.99988479995392 +0.01302600521040209j
0.99958479983392 +0.0228396091358436j
0.9990639996255999+0.03456121382448551j
0.9983151993260797+0.04599001839600736j
0.9973335989334395+0.05774762309904924j
0.9961335984534394+0.06765962706385076j]
fit1: [ 0.5826889168536897 -0.2913784245297137]
[ 0.5826889168536897 -0.2913784245297137  0.41731108314631027
-0.          ] 2.647940230604695e-11
[ 5.2227366147083421e-01 -2.5028765876716197e-01
3.8186252716450286e-01
-1.0091848669146671e-01  6.6112779285729033e-07]
2.372846190762547e-11
E_gs: -0.25028765876716197
test mps sampling took: (0.0013260841369628906, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.22946405653261398
1 Execution time: 0:01:36.578583 ovlp:
(0.998958796459908+0.037654328024715245j)
2 Execution time: 0:01:36.580901 ovlp:
(0.994991582971382+0.07826126608830464j)
3 Execution time: 0:01:36.583671 ovlp:
(0.9898083653484422+0.11755339968155898j)
4 Execution time: 0:01:36.587906 ovlp:
(0.9816915377512283+0.15483912645303j)
5 Execution time: 0:01:36.592124 ovlp:
(0.9704054993786979+0.19165365162241543j)
6 Execution time: 0:01:36.596539 ovlp:
(0.9565126521430174+0.22577776764440993j)
7 Execution time: 0:01:36.602413 ovlp:
(0.9439650094810321+0.264887500617502j)
8 Execution time: 0:01:36.608805 ovlp:
(0.9277237542607646+0.2927947955023047j)
9 Execution time: 0:01:36.616676 ovlp:
(0.9080244872832568+0.3295257203874493j)
10 Execution time: 0:01:36.624717 ovlp:
(0.8870560159904544+0.363581436176883j)
11 Execution time: 0:01:36.633684 ovlp:
(0.8654795426304449+0.3881523197178871j)
12 Execution time: 0:01:36.642775 ovlp:
(0.8409694592961616+0.4171616183495024j)
13 Execution time: 0:01:36.652664 ovlp:
(0.8175461796570109+0.44691571951344633j)

```



```

14 Execution time: 0:01:36.663993  ovlp:
(0.7879364789840286+0.4701869986357954j)
15 Execution time: 0:01:36.676136  ovlp:
(0.7608499868899554+0.49433988075559454j)
16 Execution time: 0:01:36.688527  ovlp:
(0.7329806921343534+0.515490752668559j)
17 Execution time: 0:01:36.700347  ovlp:
(0.7040169936577785+0.5314128068035431j)
18 Execution time: 0:01:36.713812  ovlp:
(0.670584479987232+0.55362768233412j)
19 Execution time: 0:01:36.728808  ovlp:
(0.6437563887717219+0.5655901230064182j)
x_points = [np.float64(0.0), np.float64(0.22946405653261398),
np.float64(0.45892811306522796), np.float64(0.6883921695978419),
np.float64(0.9178562261304559), np.float64(1.14732028266307),
np.float64(1.3767843391956838), np.float64(1.6062483957282978),
np.float64(1.8357124522609118), np.float64(2.0651765087935257),
np.float64(2.29464056532614), np.float64(2.5241046218587537),
np.float64(2.7535686783913675), np.float64(2.983032734923982),
np.float64(3.2124967914565956), np.float64(3.44196084798921),
np.float64(3.6714249045218237), np.float64(3.9008889610544375),
np.float64(4.130353017587051), np.float64(4.359817074119666)] y_points =
[1.          +0.j
0.998958796459908 +0.03765432802471524j
0.994991582971382 +0.07826126608830464j
0.9898083653484422+0.11755339968155898j
0.9816915377512283+0.15483912645303j
0.9704054993786979+0.19165365162241543j
0.9565126521430174+0.22577776764440993j
0.9439650094810321+0.264887500617502j
0.9277237542607646+0.2927947955023047j
0.9080244872832568+0.3295257203874493j
0.8870560159904544+0.363581436176883j
0.8654795426304449+0.3881523197178871j
0.8409694592961616+0.4171616183495024j
0.8175461796570109+0.44691571951344633j
0.7879364789840286+0.4701869986357954j
0.7608499868899554+0.49433988075559454j
0.7329806921343534+0.515490752668559j
0.7040169936577785+0.5314128068035431j
0.670584479987232 +0.55362768233412j
0.6437563887717219+0.5655901230064182j ]
fit1: [ 0.6318338358496344 -0.26001705719652446]
[ 0.5088845429602983 -0.288532191086367  0.3801821363551957
-0.05172927972090884] 3.2603548949981386e-09
[ 0.4994754085423481 -0.29141186385152046  0.3137048317687537
-0.05637566599958239 -0.01868868216030363]

```

2.6131635066735956e-09
E_gs: -0.29141186385152046
test mps sampling took: (0.0015349388122558594, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.20662528422039883
1 Execution time: 0:01:37.212026 ovlp:
(0.9990727968475093+0.03377071482043048j)
2 Execution time: 0:01:37.213959 ovlp:
(0.9962455872349967+0.06975683717324643j)
3 Execution time: 0:01:37.216702 ovlp:
(0.9913587706198201+0.1040785538670832j)
4 Execution time: 0:01:37.221988 ovlp:
(0.9851115493792679+0.1359226621370513j)
5 Execution time: 0:01:37.230100 ovlp:
(0.9763183194822862+0.17326158908940292j)
6 Execution time: 0:01:37.235376 ovlp:
(0.966689086742895+0.20602530048602175j)
7 Execution time: 0:01:37.241117 ovlp:
(0.9543922449336328+0.23656980433733477j)
8 Execution time: 0:01:37.246791 ovlp:
(0.9416546016256455+0.26706110800776717j)
9 Execution time: 0:01:37.254259 ovlp:
(0.924387342916966+0.29743081126475834j)
10 Execution time: 0:01:37.264034 ovlp:
(0.9082752881359797+0.3289177183202423j)
11 Execution time: 0:01:37.279110 ovlp:
(0.8908028287296177+0.3582614180888215j)
12 Execution time: 0:01:37.296024 ovlp:
(0.8704499595298625+0.3838811051957576j)
13 Execution time: 0:01:37.306795 ovlp:
(0.8489342863765736+0.4101543945249413j)
14 Execution time: 0:01:37.319075 ovlp:
(0.8275858137917669+0.43508247928042953j)
15 Execution time: 0:01:37.334300 ovlp:
(0.8030149302507628+0.4571909544492452j)
16 Execution time: 0:01:37.346994 ovlp:
(0.7793484497847292+0.47828862618132906j)
17 Execution time: 0:01:37.358351 ovlp:
(0.7538275630137143+0.49997149990309975j)
18 Execution time: 0:01:37.378038 ovlp:
(0.7270222718757244+0.5202483688444541j)
19 Execution time: 0:01:37.400549 ovlp:
(0.6996925789547686+0.5352812199561479j)
x_points = [np.float64(0.0), np.float64(0.20662528422039883),
np.float64(0.41325056844079766), np.float64(0.6198758526611965),

```
np.float64(0.8265011368815953), np.float64(1.0331264211019942),  
np.float64(1.239751705322393), np.float64(1.4463769895427918),  
np.float64(1.6530022737631906), np.float64(1.8596275579835895),  
np.float64(2.0662528422039883), np.float64(2.272878126424387),  
np.float64(2.479503410644786), np.float64(2.686128694865185),  
np.float64(2.8927539790855836), np.float64(3.0993792633059822),  
np.float64(3.3060045475263813), np.float64(3.5126298317467803),  
np.float64(3.719255115967179), np.float64(3.9258804001875776)] y_points =  
[1.          +0.j
```

```
0.9990727968475093+0.03377071482043048j  
0.9962455872349967+0.06975683717324643j  
0.9913587706198201+0.1040785538670832j  
0.9851115493792679+0.1359226621370513j  
0.9763183194822862+0.17326158908940292j  
0.966689086742895 +0.20602530048602175j  
0.9543922449336328+0.23656980433733477j  
0.9416546016256455+0.26706110800776717j  
0.924387342916966 +0.29743081126475834j  
0.9082752881359797+0.3289177183202423j  
0.8908028287296177+0.3582614180888215j  
0.8704499595298625+0.3838811051957576j  
0.8489342863765736+0.4101543945249413j  
0.8275858137917669+0.43508247928042953j  
0.8030149302507628+0.4571909544492452j  
0.7793484497847292+0.47828862618132906j  
0.7538275630137143+0.49997149990309975j  
0.7270222718757244+0.5202483688444541j  
0.6996925789547686+0.5352812199561479j ]
```

```
fit1: [ 0.6318204953368465 -0.26122975751108574]
```

```
[ 0.584383187051587 -0.2718544524227532  0.36890764380260954  
-0.01885972577925849] 9.472414314767214e-10
```

```
[ 0.4557207703743073 -0.30337702602596367  0.38268218868996584  
-0.07108004762810255 -0.01297269642235912] 7.87263750647645e-11
```

```
E_gs: -0.30337702602596367
```

```
test mps sampling took: (0.0019192695617675781, Counter({2: 6, 0: 4}))
```

```
truncated ham size: 10 Number of fitting points: 25
```

```
shots per matrix element: 208333.0
```

```
Total gate count: 172 2 qubit gates: 80
```

```
N gate: 172 dt: 0.19122845222569068
```

```
1 Execution time: 0:01:37.855590 ovlp:
```

```
(0.9992799988479981+0.03201125121800197j)
```

```
2 Execution time: 0:01:37.857506 ovlp:
```

```
(0.9970143952230324+0.060638497021595184j)
```

```
3 Execution time: 0:01:37.860934 ovlp:
```

```
(0.9926463882342211+0.09515055224088353j)
```

```
4 Execution time: 0:01:37.864490 ovlp:
```

```
(0.987097579356127+0.12957620732193176j)
```

5 Execution time: 0:01:37.869401 ovlp:
(0.9802719684351495+0.1606610570576914j)
6 Execution time: 0:01:37.874497 ovlp:
(0.9707007531212051+0.18907710252336396j)
7 Execution time: 0:01:37.881454 ovlp:
(0.9621855394968633+0.2204211526738442j)
8 Execution time: 0:01:37.892498 ovlp:
(0.950041520066432+0.2482803972486356j)
9 Execution time: 0:01:37.902203 ovlp:
(0.9369278990846386+0.2785780457248732j)
10 Execution time: 0:01:37.914293 ovlp:
(0.9201470722353156+0.30925969481551174j)
11 Execution time: 0:01:37.924744 ovlp:
(0.9056414490263185+0.3327605324168519j)
12 Execution time: 0:01:37.934439 ovlp:
(0.889839823743718+0.36133977814364493j)
13 Execution time: 0:01:37.944646 ovlp:
(0.866406186249898+0.3845046152073843j)
14 Execution time: 0:01:37.955636 ovlp:
(0.8489341582946532+0.4115382584612135j)
15 Execution time: 0:01:37.966650 ovlp:
(0.8294269270830834+0.43282149251438806j)
16 Execution time: 0:01:37.979294 ovlp:
(0.8061852898964639+0.4559287294859671j)
17 Execution time: 0:01:37.992406 ovlp:
(0.7829628527405643+0.47361195777913245j)
18 Execution time: 0:01:38.005684 ovlp:
(0.7628028204845128+0.49650799441279103j)
19 Execution time: 0:01:38.018482 ovlp:
(0.737929180686689+0.5108312173299476j)
20 Execution time: 0:01:38.034298 ovlp:
(0.712546740074784+0.5233016372826196j)
21 Execution time: 0:01:38.049266 ovlp:
(0.6882587012139219+0.541407266251626j)
22 Execution time: 0:01:38.064017 ovlp:
(0.6584026534442455+0.5540024864039783j)
23 Execution time: 0:01:38.079422 ovlp:
(0.631292210067536+0.564044102470564j)
24 Execution time: 0:01:38.097482 ovlp:
(0.6095193752310004+0.5774457239131583j)
x_points = [np.float64(0.0), np.float64(0.19122845222569068),
np.float64(0.38245690445138136), np.float64(0.5736853566770721),
np.float64(0.7649138089027627), np.float64(0.9561422611284534),
np.float64(1.1473707133541442), np.float64(1.3385991655798348),
np.float64(1.5298276178055255), np.float64(1.721056070031216),
np.float64(1.9122845222569067), np.float64(2.1035129744825976),
np.float64(2.2947414267082884), np.float64(2.485969878933979),

```

np.float64(2.6771983311596697), np.float64(2.86842678338536),
np.float64(3.059655235611051), np.float64(3.2508836878367418),
np.float64(3.442112140062432), np.float64(3.633340592288123),
np.float64(3.8245690445138134), np.float64(4.015797496739505),
np.float64(4.207025948965195), np.float64(4.3982544011908855),
np.float64(4.589482853416577)] y_points = [1.          +0.j
0.9992799988479981+0.03201125121800197j
0.9970143952230324+0.06063849702159518j
0.9926463882342211+0.09515055224088353j
0.987097579356127 +0.12957620732193176j
0.9802719684351495+0.1606610570576914j
0.9707007531212051+0.18907710252336396j
0.9621855394968633+0.2204211526738442j
0.950041520066432 +0.2482803972486356j
0.9369278990846386+0.2785780457248732j
0.9201470722353156+0.30925969481551174j
0.9056414490263185+0.3327605324168519j
0.889839823743718 +0.36133977814364493j
0.866406186249898 +0.3845046152073843j
0.8489341582946532+0.4115382584612135j
0.8294269270830834+0.43282149251438806j
0.8061852898964639+0.4559287294859671j
0.7829628527405643+0.47361195777913245j
0.7628028204845128+0.49650799441279103j
0.737929180686689 +0.5108312173299476j
0.712546740074784 +0.5233016372826196j
0.6882587012139219+0.541407266251626j
0.6584026534442455+0.5540024864039783j
0.631292210067536 +0.564044102470564j
0.6095193752310004+0.5774457239131583j ]
fit1: [ 0.6263979330235953 -0.2616320099940376]
[ 0.41440381354806266 -0.3144424337668524  0.43730729859786927
-0.08542154727137331] 1.0359384405694912e-09
[ 0.39610007332384534 -0.32464985318876954  0.3749705846665752
-0.07630852768871002 -0.05056331363085018] 5.128766233270907e-10
E_gs: -0.32464985318876954
test mps sampling took: (0.0013134479522705078, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.27576786193924513
1 Execution time: 0:01:38.698011 ovlp:
(0.9983040000000001+0.0483880000000001j)
2 Execution time: 0:01:38.699978 ovlp:
(0.992972+0.08834000000000009j)
3 Execution time: 0:01:38.702544 ovlp:
(0.9851160000000001+0.13924000000000003j)

```

```

4 Execution time: 0:01:38.705751 ovlp:
(0.9731799999999999+0.18327200000000001j)
5 Execution time: 0:01:38.709414 ovlp:
(0.958064+0.22786400000000007j)
6 Execution time: 0:01:38.713685 ovlp:
(0.93970400000000001+0.26844399999999999j)
7 Execution time: 0:01:38.718543 ovlp: (0.91916+0.30774799999999999j)
8 Execution time: 0:01:38.724082 ovlp:
(0.895572+0.34683200000000003j)
9 Execution time: 0:01:38.730058 ovlp:
(0.8702319999999999+0.38473200000000001j)
10 Execution time: 0:01:38.736758 ovlp:
(0.840972+0.41979999999999995j)
x_points = [np.float64(0.0), np.float64(0.27576786193924513),
np.float64(0.5515357238784903), np.float64(0.8273035858177353),
np.float64(1.1030714477569805), np.float64(1.3788393096962257),
np.float64(1.6546071716354707), np.float64(1.9303750335747158),
np.float64(2.206142895513961), np.float64(2.481910757453206),
np.float64(2.7576786193924514)] y_points = [1.          +0.j
0.99830400000000001+0.04838800000000001j
0.992972          +0.08834000000000009j
0.98511600000000001+0.13924000000000003j
0.9731799999999999+0.18327200000000001j
0.958064          +0.22786400000000007j
0.93970400000000001+0.26844399999999999j
0.91916          +0.30774799999999999j
0.895572          +0.34683200000000003j
0.8702319999999999+0.38473200000000001j
0.840972          +0.41979999999999995j]
fit1: [ 0.6357416955336477 -0.26279394472913026]
[ 0.6357416955336477 -0.26279394472913026 0.3642583044663523
-0.          ] 1.390683976832852e-10
[ 5.2472717533516233e-01 -2.8626845256366673e-01
3.0448023119856488e-01
-5.6879184480303983e-02 1.7322065360633806e-06]
1.3514252168615106e-10
E_gs: -0.28626845256366673
test mps sampling took: (0.001299142837524414, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.038890187704734715
1 Execution time: 0:01:39.118364 ovlp:
(0.9999735999735999+0.004279004279004184j)
2 Execution time: 0:01:39.120302 ovlp:
(0.9998811998811998+0.013664213664213554j)
3 Execution time: 0:01:39.122955 ovlp:

```

```

(0.9996787996787997+0.019239019239019273j)
4 Execution time: 0:01:39.126539  ovlp:
(0.9994059994059994+0.028646228646228566j)
5 Execution time: 0:01:39.130439  ovlp:
(0.9991463991463991+0.03311663311663304j)
6 Execution time: 0:01:39.134999  ovlp:
(0.9988779988779988+0.03817663817663819j)
7 Execution time: 0:01:39.140388  ovlp:
(0.9983499983499984+0.04350944350944341j)
8 Execution time: 0:01:39.146720  ovlp:
(0.9977955977955979+0.05452705452705442j)
9 Execution time: 0:01:39.153341  ovlp:
(0.9973115973115974+0.059085459085459036j)
10 Execution time: 0:01:39.160023  ovlp:
(0.9968187968187969+0.06621346621346613j)
11 Execution time: 0:01:39.167474  ovlp:
(0.9959167959167958+0.07116347116347121j)
x_points = [np.float64(0.0), np.float64(0.038890187704734715),
np.float64(0.07778037540946943), np.float64(0.11667056311420415),
np.float64(0.15556075081893886), np.float64(0.19445093852367357),
np.float64(0.2333411262284083), np.float64(0.272231313933143),
np.float64(0.3111215016378777), np.float64(0.35001168934261245),
np.float64(0.38890187704734713), np.float64(0.42779206475208187)]
y_points = [1.          +0.j
0.9999735999735999+0.00427900427900418j
0.9998811998811998+0.01366421366421355j
0.9996787996787997+0.01923901923901927j
0.9994059994059994+0.02864622864622857j
0.9991463991463991+0.03311663311663304j
0.9988779988779988+0.03817663817663819j
0.9983499983499984+0.04350944350944341j
0.9977955977955979+0.05452705452705442j
0.9973115973115974+0.05908545908545904j
0.9968187968187969+0.06621346621346613j
0.9959167959167958+0.07116347116347121j]
fit1: [ 0.5860697871800666 -0.29340683688434593]
[ 0.5860697871800666 -0.29340683688434593  0.41393021281993336
-0.          ] 1.0202278507130182e-10
[ 5.2380365613557800e-01 -2.5095786477826426e-01
3.7795925693585392e-01
-1.0594707757018680e-01  6.7671031945592488e-07]
9.298619661812252e-11
E_gs: -0.25095786477826426
test mps sampling took: (0.0012862682342529297, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80

```

N gate: 172 dt: 0.2499891791652309
 1 Execution time: 0:01:39.786693 ovlp:
 (0.9986007994403199+0.04109881643952651j)
 2 Execution time: 0:01:39.788614 ovlp:
 (0.994455997782399+0.08251803300721328j)
 3 Execution time: 0:01:39.791310 ovlp:
 (0.987426394970558+0.12460444984177999j)
 4 Execution time: 0:01:39.794910 ovlp:
 (0.9779655911862364+0.16732686693074683j)
 5 Execution time: 0:01:39.798805 ovlp:
 (0.9655935862374345+0.2056236822494728j)
 6 Execution time: 0:01:39.803376 ovlp:
 (0.950996780398712+0.24511329804531923j)
 x_points = [np.float64(0.0), np.float64(0.2499891791652309),
 np.float64(0.4999783583304618), np.float64(0.7499675374956927),
 np.float64(0.9999567166609236), np.float64(1.2499458958261545),
 np.float64(1.4999350749913853)] y_points = [1. +0.j
 0.9986007994403199+0.04109881643952651j
 0.994455997782399 +0.08251803300721328j
 0.987426394970558 +0.12460444984177999j
 0.9779655911862364+0.16732686693074683j
 0.9655935862374345+0.2056236822494728j
 0.950996780398712 +0.24511329804531923j]
 fit1: [0.612750373037413 -0.2735895262582655]
 [0.612750373037413 -0.2735895262582655 0.387249626962587
 -0.] 1.6153917231761034e-11
 [4.9030638213382932e-01 -2.8927618256406046e-01
 3.0965977687183838e-01
 -8.5231365651000285e-02 1.4742860259636048e-06]
 5.38104337879519e-12
 E_gs: -0.28927618256406046
 test mps sampling took: (0.001346588134765625, Counter({2: 6, 0: 4}))
 truncated ham size: 10 Number of fitting points: 18
 shots per matrix element: 294117.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.16158430622971448
 1 Execution time: 0:01:40.347415 ovlp:
 (0.9993743986236769+0.021477847251264004j)
 2 Execution time: 0:01:40.349329 ovlp:
 (0.9976335947939086+0.05283271623197572j)
 3 Execution time: 0:01:40.351795 ovlp:
 (0.994627988181574+0.08190278018611652j)
 4 Execution time: 0:01:40.355441 ovlp:
 (0.9908063797740354+0.10964004120809068j)
 5 Execution time: 0:01:40.359354 ovlp:
 (0.9858763689280117+0.1350108970239734j)
 6 Execution time: 0:01:40.363916 ovlp:


```

(0.9798107555836624+0.16259855771682696j)
7 Execution time: 0:01:40.369035  ovlp:
(0.9720315384693847+0.18976461748215856j)
8 Execution time: 0:01:40.374588  ovlp:
(0.9623483171662979+0.21081066378346036j)
9 Execution time: 0:01:40.380703  ovlp:
(0.9540930990048178+0.23851392473063449j)
10 Execution time: 0:01:40.387341  ovlp:
(0.9437978763553281+0.2620487765073083j)
11 Execution time: 0:01:40.395491  ovlp:
(0.9317754499059898+0.28744683238303126j)
12 Execution time: 0:01:40.405057  ovlp:
(0.9191818222000088+0.31387849053267924j)
13 Execution time: 0:01:40.414029  ovlp:
(0.9044461897816176+0.3311709285760429j)
14 Execution time: 0:01:40.423275  ovlp:
(0.8907917597418715+0.3568953851698473j)
15 Execution time: 0:01:40.433110  ovlp:
(0.8766001285202827+0.377696630932588j)
16 Execution time: 0:01:40.443536  ovlp:
(0.8573424861534695+0.39650547231203914j)
17 Execution time: 0:01:40.456499  ovlp:
(0.8424504533909976+0.41786431930150236j)
x_points = [np.float64(0.0), np.float64(0.16158430622971448),
np.float64(0.32316861245942896), np.float64(0.48475291868914344),
np.float64(0.6463372249188579), np.float64(0.8079215311485723),
np.float64(0.9695058373782869), np.float64(1.1310901436080014),
np.float64(1.2926744498377158), np.float64(1.4542587560674303),
np.float64(1.6158430622971447), np.float64(1.7774273685268593),
np.float64(1.9390116747565738), np.float64(2.1005959809862884),
np.float64(2.262180287216003), np.float64(2.4237645934457173),
np.float64(2.5853488996754317), np.float64(2.746933205905146)] y_points
= [1.          +0.j
0.9993743986236769+0.021477847251264j
0.9976335947939086+0.05283271623197572j
0.994627988181574 +0.08190278018611652j
0.9908063797740354+0.10964004120809068j
0.9858763689280117+0.1350108970239734j
0.9798107555836624+0.16259855771682696j
0.9720315384693847+0.18976461748215856j
0.9623483171662979+0.21081066378346036j
0.9540930990048178+0.23851392473063449j
0.9437978763553281+0.2620487765073083j
0.9317754499059898+0.28744683238303126j
0.9191818222000088+0.31387849053267924j
0.9044461897816176+0.3311709285760429j
0.8907917597418715+0.3568953851698473j

```

0.8766001285202827+0.377696630932588j
0.8573424861534695+0.39650547231203914j
0.8424504533909976+0.41786431930150236j]
fit1: [0.6331017468009622 -0.2640667580915412]
[0.6331017468009622 -0.2640667580915412 0.3668982531990378
-0.] 7.620794017746867e-10
[4.9653787512002318e-01 -2.9447124897931415e-01
3.2028369566319126e-01
-6.7849593498174904e-02 1.0463735500623330e-06]
6.858562110915519e-10
E_gs: -0.29447124897931415
test mps sampling took: (0.0013127326965332031, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.08788677251733854
1 Execution time: 0:01:40.850249 ovlp:
(0.9998435997810398+0.012700617780864842j)
2 Execution time: 0:01:40.852228 ovlp:
(0.9993927991499187+0.02971144159601824j)
3 Execution time: 0:01:40.854810 ovlp:
(0.9983531976944768+0.04943626921077682j)
4 Execution time: 0:01:40.857973 ovlp:
(0.9975251965352752+0.0587374822324751j)
5 Execution time: 0:01:40.861749 ovlp:
(0.9955379937531912+0.07380710332994456j)
6 Execution time: 0:01:40.865965 ovlp:
(0.9936243910741476+0.08825112355157305j)
7 Execution time: 0:01:40.870858 ovlp:
(0.9914255879958231+0.10296194414672177j)
8 Execution time: 0:01:40.876272 ovlp:
(0.9891163847629387+0.11723116412362988j)
9 Execution time: 0:01:40.882499 ovlp:
(0.9858503801905323+0.13334958668942143j)
10 Execution time: 0:01:40.889286 ovlp:
(0.9829063760689265+0.14506120308568438j)
11 Execution time: 0:01:40.896518 ovlp:
(0.9796863715609201+0.15918322285651199j)
12 Execution time: 0:01:40.905533 ovlp:
(0.9755555657777921+0.17574324604054437j)
13 Execution time: 0:01:40.915653 ovlp:
(0.971875560625785+0.1907392670349739j)
14 Execution time: 0:01:40.925025 ovlp:
(0.9669811537736153+0.20133768187275458j)
15 Execution time: 0:01:40.936481 ovlp:
(0.9609091452728034+0.21557930181102258j)
16 Execution time: 0:01:40.947376 ovlp:

```

(0.956152738613834+0.23055692277969198j)
17 Execution time: 0:01:40.958516  ovlp:
(0.9512951318131846+0.24819334747068655j)
18 Execution time: 0:01:40.970059  ovlp:
(0.9445055223077312+0.25652855913998285j)
19 Execution time: 0:01:40.982420  ovlp:
(0.9391603148244407+0.274459384243138j)
20 Execution time: 0:01:40.995436  ovlp:
(0.9336955071737101+0.2842849979989972j)
21 Execution time: 0:01:41.008968  ovlp:
(0.9252774953884935+0.29445101223141723j)
22 Execution time: 0:01:41.022936  ovlp:
(0.9186902861664006+0.3086650321310449j)
23 Execution time: 0:01:41.037626  ovlp:
(0.9104378746130244+0.32636585691219966j)
x_points = [np.float64(0.0), np.float64(0.08788677251733854),
np.float64(0.17577354503467707), np.float64(0.2636603175520156),
np.float64(0.35154709006935414), np.float64(0.4394338625866927),
np.float64(0.5273206351040312), np.float64(0.6152074076213697),
np.float64(0.7030941801387083), np.float64(0.7909809526560468),
np.float64(0.8788677251733854), np.float64(0.9667544976907239),
np.float64(1.0546412702080623), np.float64(1.142528042725401),
np.float64(1.2304148152427394), np.float64(1.318301587760078),
np.float64(1.4061883602774166), np.float64(1.494075132794755),
np.float64(1.5819619053120937), np.float64(1.6698486778294321),
np.float64(1.7577354503467708), np.float64(1.8456222228641093),
np.float64(1.9335089953814477), np.float64(2.0213957678987864)] y_points
= [1.          +0.j
0.9998435997810398+0.01270061778086484j
0.9993927991499187+0.02971144159601824j
0.9983531976944768+0.04943626921077682j
0.9975251965352752+0.0587374822324751j
0.9955379937531912+0.07380710332994456j
0.9936243910741476+0.08825112355157305j
0.9914255879958231+0.10296194414672177j
0.9891163847629387+0.11723116412362988j
0.9858503801905323+0.13334958668942143j
0.9829063760689265+0.14506120308568438j
0.9796863715609201+0.15918322285651199j
0.9755555657777921+0.17574324604054437j
0.971875560625785 +0.1907392670349739j
0.9669811537736153+0.20133768187275458j
0.9609091452728034+0.21557930181102258j
0.956152738613834 +0.23055692277969198j
0.9512951318131846+0.24819334747068655j
0.9445055223077312+0.25652855913998285j
0.9391603148244407+0.274459384243138j

```

0.9336955071737101+0.2842849979989972j
0.9252774953884935+0.29445101223141723j
0.9186902861664006+0.3086650321310449j
0.9104378746130244+0.32636585691219966j]
fit1: [0.6333554100057303 -0.2656521883345214]
[0.6333554100057303 -0.2656521883345214 0.36664458999426974
-0.] 6.232330593075638e-10
[5.2223561486435344e-01 -2.8831573361207868e-01
2.8066142327575960e-01
-6.4256618549142372e-02 3.2434759645112255e-06]
5.991428900835582e-10
E_gs: -0.2883157336120787
test mps sampling took: (0.0013058185577392578, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.06710711405760425
1 Execution time: 0:01:41.475883 ovlp:
(0.9999199999999999+0.011152000000000005j)
2 Execution time: 0:01:41.477780 ovlp:
(0.9996320000000001+0.025295999999999985j)
3 Execution time: 0:01:41.480273 ovlp:
(0.9992399999999999+0.030319999999999903j)
4 Execution time: 0:01:41.483343 ovlp:
(0.998416+0.043279999999999985j)
5 Execution time: 0:01:41.487086 ovlp: (0.997536+0.058280000000000011j)
6 Execution time: 0:01:41.491261 ovlp:
(0.996448+0.06808799999999993j)
7 Execution time: 0:01:41.496046 ovlp:
(0.9949680000000001+0.082200000000000005j)
8 Execution time: 0:01:41.501400 ovlp: (0.993808+0.091264000000000001j)
9 Execution time: 0:01:41.507342 ovlp:
(0.9918480000000001+0.104144000000000001j)
10 Execution time: 0:01:41.514747 ovlp: (0.990504+0.111968000000000007j)
11 Execution time: 0:01:41.523211 ovlp:
(0.988408+0.124200000000000009j)
12 Execution time: 0:01:41.531304 ovlp:
(0.9855119999999999+0.132864000000000001j)
13 Execution time: 0:01:41.539863 ovlp: (0.983584+0.141432j)
14 Execution time: 0:01:41.549086 ovlp:
(0.98028+0.155008000000000003j)
15 Execution time: 0:01:41.558775 ovlp:
(0.977592+0.167896000000000005j)
16 Execution time: 0:01:41.569227 ovlp:
(0.974688+0.18045599999999995j)
17 Execution time: 0:01:41.580225 ovlp:
(0.9718880000000001+0.190592000000000001j)

```

18 Execution time: 0:01:41.591954  ovlp: (0.967544+0.19883999999999999j)
19 Execution time: 0:01:41.606607  ovlp:
(0.964736+0.211343999999999998j)
20 Execution time: 0:01:41.619929  ovlp: (0.96068+0.22169599999999999j)
x_points = [np.float64(0.0), np.float64(0.06710711405760425),
np.float64(0.1342142281152085), np.float64(0.20132134217281275),
np.float64(0.268428456230417), np.float64(0.3355355702880213),
np.float64(0.4026426843456255), np.float64(0.4697497984032297),
np.float64(0.536856912460834), np.float64(0.6039640265184383),
np.float64(0.6710711405760426), np.float64(0.7381782546336467),
np.float64(0.805285368691251), np.float64(0.8723924827488553),
np.float64(0.9394995968064594), np.float64(1.0066067108640637),
np.float64(1.073713824921668), np.float64(1.1408209389792723),
np.float64(1.2079280530368766), np.float64(1.2750351670944808),
np.float64(1.3421422811520851)] y_points = [1.          +0.j
0.9999199999999999+0.011152000000000005j
0.9996320000000001+0.025295999999999999j
0.9992399999999999+0.03031999999999999j
0.998416          +0.043279999999999999j
0.997536          +0.058280000000000001j
0.996448          +0.068087999999999993j
0.9949680000000001+0.082200000000000005j
0.993808          +0.091264000000000001j
0.9918480000000001+0.104144000000000001j
0.990504          +0.111968000000000007j
0.988408          +0.124200000000000009j
0.9855119999999999+0.132864000000000001j
0.983584          +0.141432j
0.98028          +0.1550080000000000003j
0.977592          +0.1678960000000000005j
0.974688          +0.180455999999999995j
0.9718880000000001+0.190592000000000001j
0.967544          +0.19883999999999999j
0.964736          +0.211343999999999998j
0.96068          +0.22169599999999999j ]
fit1: [ 0.6279375494790799 -0.2679436919505392]
[ 0.6279375494790799 -0.2679436919505392  0.37206245052092013
-0.          ] 3.90766643007116e-10
[ 4.9790711316713149e-01 -2.8942039869716585e-01
2.8090174446865490e-01
-8.5943506623711530e-02  1.2516147774013188e-06]
3.7870163583282776e-10
E_gs: -0.28942039869716585
test mps sampling took: (0.0013015270233154297, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 172 2 qubit gates: 80

```

```

N gate: 172 dt: 0.22013019758210833
1 Execution time: 0:01:42.101425 ovlp:
(0.9989547989547989+0.039252239252239196j)
2 Execution time: 0:01:42.103337 ovlp:
(0.9956839956839958+0.07418067418067409j)
3 Execution time: 0:01:42.105991 ovlp:
(0.9903851903851904+0.11275951275951268j)
4 Execution time: 0:01:42.109546 ovlp:
(0.9824135824135825+0.14629434629434623j)
5 Execution time: 0:01:42.113418 ovlp:
(0.973037973037973+0.1845091845091844j)
6 Execution time: 0:01:42.117980 ovlp:
(0.9611143611143611+0.2187096187096187j)
7 Execution time: 0:01:42.122986 ovlp:
(0.9486499486499487+0.25206765206765214j)
8 Execution time: 0:01:42.128425 ovlp:
(0.9316511316511316+0.2863200863200863j)
9 Execution time: 0:01:42.134449 ovlp:
(0.9142883142883143+0.31375531375531374j)
10 Execution time: 0:01:42.142205 ovlp:
(0.894933894933895+0.3486421486421487j)
11 Execution time: 0:01:42.149952 ovlp:
(0.8754702754702754+0.3746681746681746j)
12 Execution time: 0:01:42.157798 ovlp:
(0.8540358540358541+0.404089804089804j)
13 Execution time: 0:01:42.166266 ovlp:
(0.8302822302822304+0.4315562315562316j)
x_points = [np.float64(0.0), np.float64(0.22013019758210833),
np.float64(0.44026039516421667), np.float64(0.660390592746325),
np.float64(0.8805207903284333), np.float64(1.1006509879105417),
np.float64(1.32078118549265), np.float64(1.5409113830747583),
np.float64(1.7610415806568667), np.float64(1.981171778238975),
np.float64(2.2013019758210834), np.float64(2.4214321734031916),
np.float64(2.6415623709853), np.float64(2.8616925685674084)] y_points =
[1.          +0.j
0.9989547989547989+0.0392522392522392j
0.9956839956839958+0.07418067418067409j
0.9903851903851904+0.11275951275951268j
0.9824135824135825+0.14629434629434623j
0.973037973037973 +0.1845091845091844j
0.9611143611143611+0.2187096187096187j
0.9486499486499487+0.25206765206765214j
0.9316511316511316+0.2863200863200863j
0.9142883142883143+0.31375531375531374j
0.894933894933895 +0.3486421486421487j
0.8754702754702754+0.3746681746681746j
0.8540358540358541+0.404089804089804j

```

```

0.8302822302822304+0.4315562315562316j ]
fit1: [ 0.6327162109784031 -0.2638492975266018]
[ 0.6327162109784031 -0.2638492975266018 0.36728378902159686
-0.          ] 3.254311086246082e-10
[ 5.2866717138933672e-01 -2.8779622873215188e-01
3.1405876791449583e-01
-4.9161393786599943e-02 1.2273030590678607e-06]
1.9242370599298634e-10
E_gs: -0.2877962287321519
test mps sampling took: (0.0012710094451904297, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.20292241474639783
1 Execution time: 0:01:42.554059 ovlp:
(0.9990951990951991+0.03185263185263176j)
2 Execution time: 0:01:42.556038 ovlp:
(0.9964223964223964+0.06755586755586762j)
3 Execution time: 0:01:42.558612 ovlp:
(0.991867191867192+0.10201110201110208j)
4 Execution time: 0:01:42.562219 ovlp:
(0.9856323856323856+0.13348673348673357j)
5 Execution time: 0:01:42.566216 ovlp:
(0.9772239772239772+0.16988676988676987j)
6 Execution time: 0:01:42.570720 ovlp:
(0.966974766974767+0.20148720148720156j)
7 Execution time: 0:01:42.575834 ovlp:
(0.9557531557531558+0.23321243321243323j)
8 Execution time: 0:01:42.581336 ovlp:
(0.9428207428207429+0.262914862914863j)
9 Execution time: 0:01:42.587327 ovlp:
(0.927917527917528+0.2933712933712933j)
10 Execution time: 0:01:42.594953 ovlp:
(0.9102687102687104+0.32389012389012395j)
11 Execution time: 0:01:42.602676 ovlp:
(0.8934830934830935+0.3527865527865528j)
12 Execution time: 0:01:42.612006 ovlp:
(0.8735254735254736+0.3776269776269776j)
13 Execution time: 0:01:42.622833 ovlp:
(0.853021853021853+0.40567580567580563j)
x_points = [np.float64(0.0), np.float64(0.20292241474639783),
np.float64(0.40584482949279566), np.float64(0.6087672442391935),
np.float64(0.8116896589855913), np.float64(1.014612073731989),
np.float64(1.217534488478387), np.float64(1.420456903224785),
np.float64(1.6233793179711826), np.float64(1.8263017327175803),
np.float64(2.029224147463978), np.float64(2.232146562210376),
np.float64(2.435068976956774), np.float64(2.6379913917031717)] y_points =

```

```

[1.          +0.j
 0.9990951990951991+0.03185263185263176j
 0.9964223964223964+0.06755586755586762j
 0.991867191867192 +0.10201110201110208j
 0.9856323856323856+0.13348673348673357j
 0.9772239772239772+0.16988676988676987j
 0.966974766974767 +0.20148720148720156j
 0.9557531557531558+0.23321243321243323j
 0.9428207428207429+0.262914862914863j
 0.927917527917528 +0.2933712933712933j
 0.9102687102687104+0.32389012389012395j
 0.8934830934830935+0.3527865527865528j
 0.8735254735254736+0.3776269776269776j
 0.853021853021853 +0.40567580567580563j]
fit1: [ 0.632417397778895 -0.26440545222995715]
[ 0.632417397778895 -0.26440545222995715 0.36758260222110495
 -0.          ] 3.644735117390781e-11
[ 4.9694614003712861e-01 -2.9373200101910613e-01
 3.1558857630566906e-01
 -6.9379007417974453e-02 1.1069222747333752e-06]
2.454711897981342e-11
E_gs: -0.2937320010191061
test mps sampling took: (0.0012862682342529297, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1954637543202283
1 Execution time: 0:01:43.035781 ovlp:
(0.9991776000000001+0.0314783999999999906j)
2 Execution time: 0:01:43.037746 ovlp:
(0.9966303999999999+0.067420800000000006j)
3 Execution time: 0:01:43.040304 ovlp:
(0.9926112+0.100265599999999995j)
4 Execution time: 0:01:43.043476 ovlp:
(0.9865280000000001+0.131395200000000005j)
5 Execution time: 0:01:43.047157 ovlp: (0.9788576+0.16408320000000001j)
6 Execution time: 0:01:43.051376 ovlp:
(0.9695296+0.193155200000000008j)
7 Execution time: 0:01:43.056434 ovlp:
(0.9596096000000001+0.224604800000000005j)
8 Execution time: 0:01:43.061937 ovlp:
(0.9457152+0.255321600000000004j)
x_points = [np.float64(0.0), np.float64(0.1954637543202283),
np.float64(0.3909275086404566), np.float64(0.5863912629606849),
np.float64(0.7818550172809132), np.float64(0.9773187716011416),
np.float64(1.1727825259213698), np.float64(1.3682462802415982),
np.float64(1.5637100345618264)] y_points = [1.          +0.j

```


0.9991776000000001+0.03147839999999991j
0.9966303999999999+0.06742080000000006j
0.9926112 +0.10026559999999995j
0.9865280000000001+0.13139520000000005j
0.9788576 +0.16408320000000001j
0.9695296 +0.19315520000000008j
0.9596096000000001+0.22460480000000005j
0.9457152 +0.25532160000000004j
fit1: [0.618325883469028 -0.2722542791639062]
[0.618325883469028 -0.2722542791639062 0.38167411653097205
-0.] 2.927020070791688e-11
[5.2335491708687387e-01 -2.8020934155643112e-01
2.5671667884540456e-01
-8.7223051321621795e-02 3.8082798890053226e-06]
6.500324649704513e-11
E_gs: -0.2802093415564311
test mps sampling took: (0.0013499259948730469, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.07623481694098394
1 Execution time: 0:01:43.590325 ovlp:
(0.9998855996339189+0.013076841845893972j)
2 Execution time: 0:01:43.592272 ovlp:
(0.9994279981695942+0.024235277552888235j)
3 Execution time: 0:01:43.594779 ovlp:
(0.9988559963391883+0.038165722130310886j)
4 Execution time: 0:01:43.597885 ovlp:
(0.9979407934105389+0.05117216375092393j)
5 Execution time: 0:01:43.601550 ovlp:
(0.9965591889894048+0.06598261114435555j)
6 Execution time: 0:01:43.605858 ovlp:
(0.9950983843148298+0.07774824879439612j)
7 Execution time: 0:01:43.610675 ovlp:
(0.9936111795557745+0.0918898940476609j)
8 Execution time: 0:01:43.616225 ovlp:
(0.9913935724594318+0.10458833468267104j)
9 Execution time: 0:01:43.622324 ovlp:
(0.9901175683762189+0.11593157098102713j)
10 Execution time: 0:01:43.629941 ovlp:
(0.9871607589144284+0.1296156147699672j)
11 Execution time: 0:01:43.639217 ovlp:
(0.9848463515083248+0.14049244957583862j)
12 Execution time: 0:01:43.648652 ovlp:
(0.9822503432010983+0.1575469041500932j)
13 Execution time: 0:01:43.657878 ovlp:
(0.9787919321341829+0.1697173430954979j)

14 Execution time: 0:01:43.667688 ovlp:
(0.9756503220810306+0.17748776796085752j)
15 Execution time: 0:01:43.677522 ovlp:
(0.9713119081981063+0.18592699496638398j)
16 Execution time: 0:01:43.687996 ovlp:
(0.9672726952726249+0.1992854377134008j)
17 Execution time: 0:01:43.701362 ovlp:
(0.9634534830511459+0.21393748459995066j)
18 Execution time: 0:01:43.713602 ovlp:
(0.9584374669998943+0.2264863247562392j)
19 Execution time: 0:01:43.728366 ovlp:
(0.9534566510612834+0.23474075117040383j)
20 Execution time: 0:01:43.741666 ovlp:
(0.9495670386145236+0.24942799816959416j)
21 Execution time: 0:01:43.757733 ovlp:
(0.9423422154950896+0.2613432362983561j)
22 Execution time: 0:01:43.772229 ovlp:
(0.938778204090253+0.276180083776268j)
x_points = [np.float64(0.0), np.float64(0.07623481694098394),
np.float64(0.15246963388196788), np.float64(0.22870445082295182),
np.float64(0.30493926776393576), np.float64(0.3811740847049197),
np.float64(0.45740890164590364), np.float64(0.5336437185868876),
np.float64(0.6098785355278715), np.float64(0.6861133524688554),
np.float64(0.7623481694098394), np.float64(0.8385829863508234),
np.float64(0.9148178032918073), np.float64(0.9910526202327912),
np.float64(1.0672874371737753), np.float64(1.1435222541147592),
np.float64(1.219757071055743), np.float64(1.295991887996727),
np.float64(1.3722267049377108), np.float64(1.448461521878695),
np.float64(1.5246963388196788), np.float64(1.6009311557606627),
np.float64(1.6771659727016468)] y_points = [1. +0.j
0.9998855996339189+0.01307684184589397j
0.9994279981695942+0.02423527755288823j
0.9988559963391883+0.03816572213031089j
0.9979407934105389+0.05117216375092393j
0.9965591889894048+0.06598261114435555j
0.9950983843148298+0.07774824879439612j
0.9936111795557745+0.0918898940476609j
0.9913935724594318+0.10458833468267104j
0.9901175683762189+0.11593157098102713j
0.9871607589144284+0.1296156147699672j
0.9848463515083248+0.14049244957583862j
0.9822503432010983+0.1575469041500932j
0.9787919321341829+0.1697173430954979j
0.9756503220810306+0.17748776796085752j
0.9713119081981063+0.18592699496638398j
0.9672726952726249+0.1992854377134008j
0.9634534830511459+0.21393748459995066j

0.9584374669998943+0.2264863247562392j
 0.9534566510612834+0.23474075117040383j
 0.9495670386145236+0.24942799816959416j
 0.9423422154950896+0.2613432362983561j
 0.938778204090253 +0.276180083776268j]
 fit1: [0.6384913489480197 -0.26448301167589167]
 [0.6384913489480197 -0.26448301167589167 0.36150865105198027
 -0.] 7.868535555779344e-10
 [5.1439167183672851e-01 -2.9099601854972074e-01
 2.5975910228895316e-01
 -7.4606498667399268e-02 3.7377469607731424e-06]
 7.625106455094307e-10
 E_gs: -0.29099601854972074
 test mps sampling took: (0.0013048648834228516, Counter({0: 5, 2: 5}))
 truncated ham size: 10 Number of fitting points: 21
 shots per matrix element: 250000.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.17411134544443405
 1 Execution time: 0:01:44.238617 ovlp:
 (0.9994000000000001+0.02825600000000006j)
 2 Execution time: 0:01:44.240518 ovlp: (0.997368+0.05712000000000006j)
 3 Execution time: 0:01:44.242977 ovlp: (0.994048+0.088584j)
 4 Execution time: 0:01:44.246268 ovlp:
 (0.9892319999999999+0.11558399999999991j)
 5 Execution time: 0:01:44.249928 ovlp:
 (0.9827999999999999+0.14270399999999994j)
 6 Execution time: 0:01:44.254141 ovlp: (0.976936+0.17375199999999999j)
 7 Execution time: 0:01:44.259025 ovlp:
 (0.9677279999999999+0.20187200000000005j)
 8 Execution time: 0:01:44.264462 ovlp:
 (0.956448+0.23184000000000005j)
 9 Execution time: 0:01:44.271515 ovlp:
 (0.948504+0.25682399999999994j)
 10 Execution time: 0:01:44.278979 ovlp: (0.93408+0.279744j)
 11 Execution time: 0:01:44.287163 ovlp:
 (0.9219919999999999+0.31136000000000001j)
 12 Execution time: 0:01:44.296895 ovlp:
 (0.9055519999999999+0.3302799999999999j)
 13 Execution time: 0:01:44.307293 ovlp: (0.8912800000000001+0.35348j)
 14 Execution time: 0:01:44.317946 ovlp: (0.873664+0.37976000000000001j)
 15 Execution time: 0:01:44.328944 ovlp: (0.855728+0.401224j)
 16 Execution time: 0:01:44.340109 ovlp:
 (0.8378159999999999+0.4217599999999999j)
 17 Execution time: 0:01:44.352458 ovlp:
 (0.8182320000000001+0.44265999999999994j)
 18 Execution time: 0:01:44.366505 ovlp:
 (0.8002480000000001+0.45930399999999993j)

```

19 Execution time: 0:01:44.379270  ovlp: (0.776392+0.48009600000000001j)
20 Execution time: 0:01:44.392574  ovlp:
(0.756624+0.49791999999999999j)
x_points = [np.float64(0.0), np.float64(0.17411134544443405),
np.float64(0.3482226908888681), np.float64(0.5223340363333021),
np.float64(0.6964453817777362), np.float64(0.8705567272221703),
np.float64(1.0446680726666042), np.float64(1.2187794181110383),
np.float64(1.3928907635554724), np.float64(1.5670021089999064),
np.float64(1.7411134544443405), np.float64(1.9152247998887746),
np.float64(2.0893361453332084), np.float64(2.2634474907776427),
np.float64(2.4375588362220766), np.float64(2.611670181666511),
np.float64(2.7857815271109447), np.float64(2.9598928725553786),
np.float64(3.134004217999813), np.float64(3.3081155634442467),
np.float64(3.482226908888681)] y_points = [1.          +0.j
0.99940000000000001+0.028256000000000006j
0.997368          +0.057120000000000006j
0.994048          +0.088584j
0.9892319999999999+0.11558399999999991j
0.9827999999999999+0.14270399999999994j
0.976936          +0.17375199999999999j
0.9677279999999999+0.201872000000000005j
0.956448          +0.231840000000000005j
0.948504          +0.256823999999999994j
0.93408          +0.279744j
0.9219919999999999+0.311360000000000001j
0.9055519999999999+0.33027999999999999j
0.89128000000000001+0.35348j
0.873664          +0.379760000000000001j
0.855728          +0.401224j
0.8378159999999999+0.42175999999999999j
0.81823200000000001+0.44265599999999994j
0.80024800000000001+0.45930399999999993j
0.776392          +0.480096000000000001j
0.756624          +0.49791999999999999j ]
fit1: [ 0.6337621363766527 -0.2621779700969461]
[ 6.337031820728039e-01 -2.620672109031216e-01
3.662379134374501e-01
-2.336298374428170e-04] 2.242007535817473e-09
[ 5.0574906262233266e-01 -2.8966945527050880e-01
2.8921338058640828e-01
-7.2196657516305870e-02  1.0936165749586582e-04]
8.940438823277217e-10
E_gs: -0.2896694552705088
test mps sampling took: (0.0013408660888671875, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80

```

N gate: 172 dt: 0.05072420188734017

1 Execution time: 0:01:44.781193 ovlp:

(0.9999159999159999+0.010197010197010137j)

2 Execution time: 0:01:44.783278 ovlp:

(0.9997659997659998+0.014991014991015073j)

3 Execution time: 0:01:44.785883 ovlp:

(0.9994719994719994+0.02564702564702559j)

4 Execution time: 0:01:44.789203 ovlp:

(0.9990939990939991+0.035157035157035166j)

5 Execution time: 0:01:44.792874 ovlp:

(0.9986199986199986+0.041427041427041456j)

6 Execution time: 0:01:44.797152 ovlp:

(0.9978219978219978+0.05128505128505134j)

7 Execution time: 0:01:44.802700 ovlp:

(0.9972339972339972+0.05931905931905934j)

8 Execution time: 0:01:44.809289 ovlp:

(0.9963219963219963+0.06749106749106759j)

9 Execution time: 0:01:44.816038 ovlp:

(0.9952299952299952+0.07532107532107535j)

10 Execution time: 0:01:44.822871 ovlp:

(0.9944319944319944+0.08210708210708217j)

11 Execution time: 0:01:44.830209 ovlp:

(0.9932319932319933+0.09402309402309394j)

12 Execution time: 0:01:44.838210 ovlp:

(0.9917379917379918+0.10301110301110294j)

13 Execution time: 0:01:44.846801 ovlp:

(0.9904059904059903+0.11068511068511078j)

14 Execution time: 0:01:44.856148 ovlp:

(0.9892539892539893+0.12144312144312153j)

15 Execution time: 0:01:44.866021 ovlp:

(0.9875859875859876+0.12780312780312775j)

x_points = [np.float64(0.0), np.float64(0.05072420188734017),

np.float64(0.10144840377468034), np.float64(0.1521726056620205),

np.float64(0.20289680754936068), np.float64(0.25362100943670085),

np.float64(0.304345211324041), np.float64(0.3550694132113812),

np.float64(0.40579361509872136), np.float64(0.45651781698606153),

np.float64(0.5072420188734017), np.float64(0.5579662207607419),

np.float64(0.608690422648082), np.float64(0.6594146245354222),

np.float64(0.7101388264227624), np.float64(0.7608630283101026)] y_points

= [1. +0.j

0.9999159999159999+0.01019701019701014j

0.9997659997659998+0.01499101499101507j

0.9994719994719994+0.02564702564702559j

0.9990939990939991+0.03515703515703517j

0.9986199986199986+0.04142704142704146j

0.9978219978219978+0.05128505128505134j

0.9972339972339972+0.05931905931905934j

```

0.9963219963219963+0.06749106749106759j
0.9952299952299952+0.07532107532107535j
0.9944319944319944+0.08210708210708217j
0.9932319932319933+0.09402309402309394j
0.9917379917379918+0.10301110301110294j
0.9904059904059903+0.11068511068511078j
0.9892539892539893+0.12144312144312153j
0.9875859875859876+0.12780312780312775j]
fit1: [ 0.579546980709139 -0.29249070128550536]
[ 0.579546980709139 -0.29249070128550536 0.420453019290861
-0.          ] 1.4462042874012583e-10
[ 5.2081187230046544e-01 -2.5064234407017971e-01
3.8706947188177465e-01
-9.8734775118028958e-02 5.9174912167581760e-07]
1.2994000868644133e-10
E_gs: -0.2506423440701797
test mps sampling took: (0.008733987808227539, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.15319392850198205
1 Execution time: 0:01:45.578495 ovlp:
(0.9993839993839995+0.024087024087024123j)
2 Execution time: 0:01:45.580624 ovlp:
(0.9979391979391978+0.05246785246785257j)
3 Execution time: 0:01:45.583217 ovlp:
(0.9953043953043954+0.07482027482027487j)
4 Execution time: 0:01:45.586487 ovlp:
(0.9914011914011913+0.10393470393470383j)
5 Execution time: 0:01:45.590400 ovlp:
(0.9871227871227872+0.1255983255983255j)
6 Execution time: 0:01:45.594667 ovlp:
(0.9813519813519813+0.15253155253155248j)
7 Execution time: 0:01:45.599494 ovlp:
(0.9738535738535739+0.17964957964957962j)
x_points = [np.float64(0.0), np.float64(0.15319392850198205),
np.float64(0.3063878570039641), np.float64(0.45958178550594614),
np.float64(0.6127757140079282), np.float64(0.7659696425099103),
np.float64(0.9191635710118923), np.float64(1.0723574995138743)] y_points
= [1.          +0.j
0.9993839993839995+0.02408702408702412j
0.9979391979391978+0.05246785246785257j
0.9953043953043954+0.07482027482027487j
0.9914011914011913+0.10393470393470383j
0.9871227871227872+0.1255983255983255j
0.9813519813519813+0.15253155253155248j
0.9738535738535739+0.17964957964957962j]

```

```

fit1: [ 0.6029432635115151 -0.2785279408085938]
[ 0.6029432635115151 -0.2785279408085938  0.39705673648848494
-0.          ] 4.4252659587294544e-11
[ 5.1706948360472849e-01 -2.7603400331422856e-01
3.2781418014983343e-01
-7.8320179920841226e-02  2.3367053241435808e-06]
8.434089515825671e-11
E_gs: -0.27603400331422856
test mps sampling took: (0.0014624595642089844, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.08944276999379605
1 Execution time: 0:01:46.075936 ovlp:
(0.9998079998079998+0.015645015645015636j)
2 Execution time: 0:01:46.078118 ovlp:
(0.9992499992499992+0.03286503286503284j)
3 Execution time: 0:01:46.081547 ovlp:
(0.9983799983799984+0.04539904539904538j)
4 Execution time: 0:01:46.084706 ovlp:
(0.9970839970839971+0.06244506244506254j)
5 Execution time: 0:01:46.090016 ovlp:
(0.9957939957939959+0.07291507291507293j)
6 Execution time: 0:01:46.096405 ovlp:
(0.9934239934239935+0.08777108777108777j)
7 Execution time: 0:01:46.102502 ovlp:
(0.9918039918039918+0.10521310521310512j)
8 Execution time: 0:01:46.109263 ovlp:
(0.9882699882699884+0.11876711876711887j)
9 Execution time: 0:01:46.115995 ovlp:
(0.9856479856479856+0.13332313332313328j)
10 Execution time: 0:01:46.123291 ovlp:
(0.9827319827319827+0.15099315099315103j)
11 Execution time: 0:01:46.130631 ovlp:
(0.9788979788979788+0.1610791610791611j)
12 Execution time: 0:01:46.140014 ovlp:
(0.9746739746739748+0.17478917478917477j)
13 Execution time: 0:01:46.150941 ovlp:
(0.9703719703719704+0.19176919176919172j)
14 Execution time: 0:01:46.163509 ovlp:
(0.9657039657039657+0.20657720657720668j)
15 Execution time: 0:01:46.174998 ovlp:
(0.9603039603039603+0.22198522198522208j)
x_points = [np.float64(0.0), np.float64(0.08944276999379605),
np.float64(0.1788855399875921), np.float64(0.2683283099813881),
np.float64(0.3577710799751842), np.float64(0.4472138499689803),
np.float64(0.5366566199627762), np.float64(0.6260993899565723),

```

```

np.float64(0.7155421599503684), np.float64(0.8049849299441645),
np.float64(0.8944276999379606), np.float64(0.9838704699317565),
np.float64(1.0733132399255525), np.float64(1.1627560099193486),
np.float64(1.2521987799131447), np.float64(1.3416415499069407)] y_points
= [1.          +0.j
0.9998079998079998+0.01564501564501564j
0.9992499992499992+0.03286503286503284j
0.9983799983799984+0.04539904539904538j
0.9970839970839971+0.06244506244506254j
0.9957939957939959+0.07291507291507293j
0.9934239934239935+0.08777108777108777j
0.9918039918039918+0.10521310521310512j
0.9882699882699884+0.11876711876711887j
0.9856479856479856+0.13332313332313328j
0.9827319827319827+0.15099315099315103j
0.9788979788979788+0.1610791610791611j
0.9746739746739748+0.17478917478917477j
0.9703719703719704+0.19176919176919172j
0.9657039657039657+0.20657720657720668j
0.9603039603039603+0.22198522198522208j]
fit1: [ 0.6273079367741929 -0.2671397168246021]
[ 0.6273079367741929 -0.2671397168246021  0.37269206322580706
-0.          ] 1.3148254559949166e-10
[ 5.5689735526041195e-01 -2.7758094459899807e-01
3.2726082167431653e-01
-3.9849528358269062e-02  1.3078944024330355e-06]
1.3481408512260709e-10
E_gs: -0.27758094459899807
test mps sampling took: (0.001260519027709961, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 7
shots per matrix element: 833333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.21013408643019188
1 Execution time: 0:01:46.639555 ovlp:
(0.999027999611999+0.03700921480368602j)
2 Execution time: 0:01:46.641487 ovlp:
(0.9961455984582395+0.0705948282379314j)
3 Execution time: 0:01:46.644860 ovlp:
(0.9907887963155184+0.10453804181521664j)
4 Execution time: 0:01:46.648811 ovlp:
(0.9845751938300775+0.14184845673938273j)
5 Execution time: 0:01:46.653051 ovlp:
(0.9757935903174362+0.1758324703329881j)
6 Execution time: 0:01:46.658164 ovlp:
(0.9649455859782343+0.2071356828542732j)
x_points = [np.float64(0.0), np.float64(0.21013408643019188),
np.float64(0.42026817286038376), np.float64(0.6304022592905756),

```



```

np.float64(0.8405363457207675), np.float64(1.0506704321509595),
np.float64(1.2608045185811512)] y_points = [1.          +0.j
0.9990279996111999+0.03700921480368602j
0.9961455984582395+0.0705948282379314j
0.9907887963155184+0.10453804181521664j
0.9845751938300775+0.14184845673938273j
0.9757935903174362+0.1758324703329881j
0.9649455859782343+0.2071356828542732j ]
fit1: [ 0.6179764446767767 -0.2730181418414166]
[ 0.6179764446767767 -0.2730181418414166  0.3820235553232233
-0.          ] 1.4978480164128984e-11
[ 5.2319829411289143e-01 -2.7346734251438570e-01
3.1590899441910975e-01
-8.0476807277652121e-02  1.9627815303914717e-06]
6.462187503237964e-11
E_gs: -0.2734673425143857
test mps sampling took: (0.0012993812561035156, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.24386874840752754
1 Execution time: 0:01:47.296277 ovlp:
(0.9987259987259987+0.04214344214344212j)
2 Execution time: 0:01:47.298249 ovlp:
(0.994950794950795+0.08379548379548374j)
3 Execution time: 0:01:47.301328 ovlp:
(0.9881907881907881+0.124932724932725j)
4 Execution time: 0:01:47.304844 ovlp:
(0.9784823784823784+0.16317876317876312j)
5 Execution time: 0:01:47.308625 ovlp:
(0.9670475670475671+0.20318240318240322j)
6 Execution time: 0:01:47.313091 ovlp:
(0.9534339534339535+0.2371956371956372j)
7 Execution time: 0:01:47.318059 ovlp:
(0.9360139360139361+0.2762528762528762j)
8 Execution time: 0:01:47.324460 ovlp:
(0.9167167167167167+0.31331851331851324j)
9 Execution time: 0:01:47.332071 ovlp:
(0.8965614965614965+0.3465465465465465j)
10 Execution time: 0:01:47.339535 ovlp:
(0.8749554749554749+0.3823277823277824j)
11 Execution time: 0:01:47.348170 ovlp:
(0.84993824993825+0.4111410111410112j)
12 Execution time: 0:01:47.358268 ovlp:
(0.8224770224770224+0.4393458393458394j)
13 Execution time: 0:01:47.368519 ovlp:
(0.7925509925509926+0.4626834626834626j)

```

```

x_points = [np.float64(0.0), np.float64(0.24386874840752754),
np.float64(0.48773749681505507), np.float64(0.7316062452225827),
np.float64(0.9754749936301101), np.float64(1.2193437420376376),
np.float64(1.4632124904451653), np.float64(1.7070812388526928),
np.float64(1.9509499872602203), np.float64(2.1948187356677478),
np.float64(2.4386874840752752), np.float64(2.6825562324828027),
np.float64(2.9264249808903307), np.float64(3.170293729297858)] y_points
= [1.          +0.j
0.9987259987259987+0.04214344214344212j
0.994950794950795 +0.08379548379548374j
0.9881907881907881+0.124932724932725j
0.9784823784823784+0.16317876317876312j
0.9670475670475671+0.20318240318240322j
0.9534339534339535+0.2371956371956372j
0.9360139360139361+0.2762528762528762j
0.9167167167167167+0.31331851331851324j
0.8965614965614965+0.3465465465465465j
0.8749554749554749+0.3823277823277824j
0.84993824993825  +0.4111410111410112j
0.8224770224770224+0.4393458393458394j
0.7925509925509926+0.4626834626834626j ]
fit1: [ 0.6285278410328687 -0.264697864316789 ]
[ 0.6285278410328687 -0.264697864316789  0.37147215896713126
-0.          ] 9.308386589953542e-10
[ 5.2826278260675841e-01 -2.8576021804114166e-01
2.3930465351664240e-01
-6.8089689178081808e-02  1.0266939434311177e-06]
4.691520047249009e-10
E_gs: -0.28576021804114166
test mps sampling took: (0.0015652179718017578, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.15989472280024336
1 Execution time: 0:01:47.763858 ovlp:
(0.999376+0.0257639999999999898j)
2 Execution time: 0:01:47.765769 ovlp: (0.9979+0.0535120000000000004j)
3 Execution time: 0:01:47.768240 ovlp:
(0.9948079999999999+0.081908000000000009j)
4 Execution time: 0:01:47.772292 ovlp:
(0.9908600000000001+0.10598400000000008j)
5 Execution time: 0:01:47.775933 ovlp:
(0.9856119999999999+0.13348800000000005j)
6 Execution time: 0:01:47.781124 ovlp: (0.9796+0.16002399999999994j)
7 Execution time: 0:01:47.786792 ovlp: (0.972296+0.18558399999999997j)
8 Execution time: 0:01:47.792540 ovlp: (0.963892+0.210936j)
9 Execution time: 0:01:47.798914 ovlp:

```

```

(0.954928+0.235948000000000005j)
10 Execution time: 0:01:47.805591  ovlp: (0.943988+0.26146399999999999j)
x_points = [np.float64(0.0), np.float64(0.15989472280024336),
np.float64(0.3197894456004867), np.float64(0.4796841684007301),
np.float64(0.6395788912009734), np.float64(0.7994736140012169),
np.float64(0.9593683368014602), np.float64(1.1192630596017035),
np.float64(1.2791577824019469), np.float64(1.4390525052021903),
np.float64(1.5989472280024337)] y_points = [1.          +0.j
0.999376          +0.02576399999999999j
0.9979            +0.053512j
0.9948079999999999+0.081908000000000009j
0.99086000000000001+0.105984000000000008j
0.9856119999999999+0.133488000000000005j
0.9796            +0.160023999999999994j
0.972296          +0.185583999999999997j
0.963892          +0.210936j
0.954928          +0.235948000000000005j
0.943988          +0.26146399999999999j ]
fit1: [ 0.6234268313389675 -0.27006320983356763]
[ 0.6234268313389675 -0.27006320983356763  0.3765731686610325
-0.          ] 7.592820366397834e-12
[ 5.2508723860573558e-01 -2.7816252272150405e-01
3.0503658724589600e-01
-7.5222931923891651e-02  3.9866975882098139e-06]
7.658637365075727e-11
E_gs: -0.27816252272150405
test mps sampling took: (0.0013833045959472656, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.012513239832631237
1 Execution time: 0:01:48.372534  ovlp:
(0.9999947999948+0.0029510029510029234j)
2 Execution time: 0:01:48.374560  ovlp:
(0.9999895999896+0.002821002821002727j)
3 Execution time: 0:01:48.377314  ovlp:
(0.9999843999844+0.00401180401180401j)
4 Execution time: 0:01:48.380882  ovlp:
(0.9999635999636001+0.007516607516607543j)
5 Execution time: 0:01:48.384682  ovlp:
(0.9999167999167999+0.011245011245011316j)
6 Execution time: 0:01:48.389699  ovlp:
(0.9998543998543998+0.013221013221013322j)
7 Execution time: 0:01:48.395346  ovlp:
(0.9997555997555998+0.013559013559013566j)
8 Execution time: 0:01:48.401688  ovlp:
(0.9997971997971997+0.016491816491816413j)

```

```

9 Execution time: 0:01:48.408687 ovlp:
(0.9996827996827997+0.02123942123942113j)
10 Execution time: 0:01:48.416199 ovlp:
(0.9996359996359996+0.0213954213954215j)
11 Execution time: 0:01:48.424069 ovlp:
(0.9995527995527995+0.02598182598182608j)
12 Execution time: 0:01:48.432732 ovlp:
(0.9994851994851994+0.025274625274625206j)
13 Execution time: 0:01:48.441325 ovlp:
(0.9992927992927993+0.026091026091026093j)
x_points = [np.float64(0.0), np.float64(0.012513239832631237),
np.float64(0.025026479665262474), np.float64(0.03753971949789371),
np.float64(0.05005295933052495), np.float64(0.06256619916315619),
np.float64(0.07507943899578742), np.float64(0.08759267882841866),
np.float64(0.1001059186610499), np.float64(0.11261915849368113),
np.float64(0.12513239832631237), np.float64(0.1376456381589436),
np.float64(0.15015887799157485), np.float64(0.1626721178242061)] y_points
= [1.          +0.j
0.9999947999948 +0.00295100295100292j
0.9999895999896 +0.00282100282100273j
0.9999843999844 +0.00401180401180401j
0.9999635999636001+0.00751660751660754j
0.9999167999167999+0.01124501124501132j
0.9998543998543998+0.01322101322101332j
0.9997555997555998+0.01355901355901357j
0.9997971997971997+0.01649181649181641j
0.9996827996827997+0.02123942123942113j
0.9996359996359996+0.0213954213954215j
0.9995527995527995+0.02598182598182608j
0.9994851994851994+0.02527462527462521j
0.9992927992927993+0.02609102609102609j]
fit1: [ 0.16364867700418714 -1.0653424659962472 ]
[ 0.16364867700418714 -1.0653424659962472  0.16365867690418714
-0.          ] 8.880385062834747e-11
[ 1.4090170870005775e-01 -9.1848712376232189e-01
1.4080195748823326e-01
-3.5136556557594378e-01 1.4013701904808478e-06]
1.0421963729240545e-10
E_gs: -0.9184871237623219
test mps sampling took: (0.0014445781707763672, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.024184649412568125
1 Execution time: 0:01:48.710040 ovlp:
(0.999984+0.0039135999999999996j)
2 Execution time: 0:01:48.712046 ovlp:

```

```

(0.9999392+0.007625599999999899j)
3 Execution time: 0:01:48.715254  ovlp:
(0.99989440000000001+0.012748800000000005j)
4 Execution time: 0:01:48.718406  ovlp:
(0.99981760000000001+0.014838399999999918j)
5 Execution time: 0:01:48.722088  ovlp:
(0.99969599999999999+0.020540800000000026j)
6 Execution time: 0:01:48.727054  ovlp:
(0.9995744+0.02566399999999991j)
7 Execution time: 0:01:48.732624  ovlp:
(0.9993376+0.027852800000000001j)
8 Execution time: 0:01:48.739321  ovlp:
(0.99915519999999999+0.032080000000000011j)
x_points = [np.float64(0.0), np.float64(0.024184649412568125),
np.float64(0.04836929882513625), np.float64(0.07255394823770438),
np.float64(0.0967385976502725), np.float64(0.12092324706284062),
np.float64(0.14510789647540875), np.float64(0.16929254588797688),
np.float64(0.193477195300545)] y_points = [1.          +0.j
0.999984      +0.003913599999999996j
0.9999392     +0.00762559999999999j
0.99989440000000001+0.0127488j
0.99981760000000001+0.01483839999999992j
0.99969599999999999+0.020540800000000003j
0.9995744     +0.02566399999999991j
0.9993376     +0.027852800000000001j
0.99915519999999999+0.032080000000000011j]
fit1: [ 0.26501090607058503 -0.6630467504728363 ]
[ 0.26501090607058503 -0.6630467504728363  0.26502090597058503
 -0.          ] 3.4644388543728896e-11
[ 2.2803597784593790e-01 -5.7064046903079702e-01
 2.2802007811463670e-01
 -2.2302761020899831e-01  1.3968370100120564e-06]
9.862777041810296e-11
E_gs: -0.570640469030797
test mps sampling took: (0.0012845993041992188, Counter({2: 8, 0: 2}))
truncated ham size: 10 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.22917395527622822
1 Execution time: 0:01:49.137710  ovlp: (0.99888320000000001+0.0404544j)
2 Execution time: 0:01:49.139660  ovlp:
(0.99524799999999999+0.07566399999999995j)
3 Execution time: 0:01:49.142189  ovlp:
(0.98971199999999999+0.11524479999999993j)
4 Execution time: 0:01:49.145294  ovlp: (0.9814912+0.15445440000000001j)
5 Execution time: 0:01:49.148988  ovlp:
(0.9706112+0.191200000000000004j)

```

```

6 Execution time: 0:01:49.153220  ovlp: (0.9581696+0.22496960000000001j)
7 Execution time: 0:01:49.158022  ovlp:
(0.9432351999999999+0.2625248j)
8 Execution time: 0:01:49.163576  ovlp:
(0.9272735999999999+0.2943967999999999j)
x_points = [np.float64(0.0), np.float64(0.22917395527622822),
np.float64(0.45834791055245644), np.float64(0.6875218658286847),
np.float64(0.9166958211049129), np.float64(1.1458697763811412),
np.float64(1.3750437316573694), np.float64(1.6042176869335976),
np.float64(1.8333916422098258)] y_points = [1.          +0.j
0.9988832000000001+0.0404544j
0.9952479999999999+0.07566399999999995j
0.9897119999999999+0.11524479999999993j
0.9814912          +0.15445440000000001j
0.9706112          +0.191200000000000004j
0.9581696          +0.22496960000000001j
0.9432351999999999+0.2625248j
0.9272735999999999+0.2943967999999999j ]
fit1: [ 0.6206712464986829 -0.27087487573802577]
[ 0.6206712464986829 -0.27087487573802577  0.3793287535013171
-0.          ] 4.678458040300976e-11
[ 5.1963724434385949e-01 -2.8721461077493915e-01
3.3172431125161334e-01
-5.8431093061851430e-02  1.4402966130154921e-06]
3.0561202679643914e-11
E_gs: -0.28721461077493915
test mps sampling took: (0.0013806819915771484, Counter({0: 5, 2: 5}))
truncated ham size: 10  Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172  dt: 0.21452807393769543
1 Execution time: 0:01:49.717450  ovlp:
(0.998943998943999+0.03707703707703702j)
2 Execution time: 0:01:49.719354  ovlp:
(0.995979995979996+0.07166707166707176j)
3 Execution time: 0:01:49.721885  ovlp:
(0.9906279906279907+0.10999510999510997j)
4 Execution time: 0:01:49.724983  ovlp:
(0.9837339837339838+0.1451131451131451j)
5 Execution time: 0:01:49.728741  ovlp:
(0.9752859752859753+0.1789591789591789j)
6 Execution time: 0:01:49.732927  ovlp:
(0.9633639633639635+0.21371121371121382j)
7 Execution time: 0:01:49.738517  ovlp:
(0.9500079500079499+0.24713124713124723j)
8 Execution time: 0:01:49.744401  ovlp:
(0.9355419355419354+0.2776112776112776j)

```

```

9 Execution time: 0:01:49.751562  ovlp:
(0.9202899202899202+0.30779730779730774j)
10 Execution time: 0:01:49.758599  ovlp:
(0.9009519009519009+0.33971733971733964j)
11 Execution time: 0:01:49.766923  ovlp:
(0.8813978813978813+0.3696993696993698j)
12 Execution time: 0:01:49.777226  ovlp:
(0.8613998613998615+0.3976593976593976j)
13 Execution time: 0:01:49.787042  ovlp:
(0.8371178371178372+0.4250674250674251j)
14 Execution time: 0:01:49.796208  ovlp:
(0.8131598131598132+0.44877944877944875j)
15 Execution time: 0:01:49.807315  ovlp:
(0.7908817908817909+0.4693174693174693j)
x_points = [np.float64(0.0), np.float64(0.21452807393769543),
np.float64(0.42905614787539087), np.float64(0.6435842218130863),
np.float64(0.8581122957507817), np.float64(1.0726403696884772),
np.float64(1.2871684436261726), np.float64(1.5016965175638681),
np.float64(1.7162245915015635), np.float64(1.9307526654392588),
np.float64(2.1452807393769544), np.float64(2.35980881331465),
np.float64(2.574336887252345), np.float64(2.7888649611900407),
np.float64(3.0033930351277363), np.float64(3.2179211090654314)] y_points
= [1.          +0.j
0.998943998943999 +0.03707703707703702j
0.995979995979996 +0.07166707166707176j
0.9906279906279907+0.10999510999510997j
0.9837339837339838+0.1451131451131451j
0.9752859752859753+0.1789591789591789j
0.9633639633639635+0.21371121371121382j
0.9500079500079499+0.24713124713124723j
0.9355419355419354+0.2776112776112776j
0.9202899202899202+0.30779730779730774j
0.9009519009519009+0.33971733971733964j
0.8813978813978813+0.3696993696993698j
0.8613998613998615+0.3976593976593976j
0.8371178371178372+0.4250674250674251j
0.8131598131598132+0.44877944877944875j
0.7908817908817909+0.4693174693174693j ]
fit1: [ 0.6347195119128252 -0.2617379608853298]
[ 0.6347195119128252 -0.2617379608853298  0.36528048808717484
-0.          ] 9.815247827389928e-10
[ 5.203608757987651e-01 -2.856084005868540e-01
2.646667502370333e-01
-6.995880711630835e-02  8.697479767301607e-07]
3.6726937808798255e-10
E_gs: -0.285608400586854
test mps sampling took: (0.0013208389282226562, Counter({2: 7, 0: 3}))

```

truncated ham size: 10 Number of fitting points: 18

shots per matrix element: 294117.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.1608678102802464

1 Execution time: 0:01:50.170784 ovlp:

(0.9993539985787969+0.027339460146812433j)

2 Execution time: 0:01:50.172715 ovlp:

(0.9977083949584689+0.0525199155438143j)

3 Execution time: 0:01:50.175524 ovlp:

(0.9945599880319738+0.08085557788227127j)

4 Execution time: 0:01:50.178811 ovlp:

(0.9906091793401945+0.10921164026560848j)

5 Execution time: 0:01:50.182503 ovlp:

(0.9860803693768125+0.13365769404692696j)

6 Execution time: 0:01:50.188004 ovlp:

(0.9790763539679788+0.16312215886874948j)

7 Execution time: 0:01:50.194406 ovlp:

(0.9722151388733056+0.1880442136972702j)

8 Execution time: 0:01:50.200878 ovlp:

(0.964061920936226+0.21423107130835684j)

9 Execution time: 0:01:50.208180 ovlp:

(0.9535898978977755+0.23899672579279674j)

10 Execution time: 0:01:50.216804 ovlp:

(0.9432946752482856+0.2630755787662733j)

11 Execution time: 0:01:50.224668 ovlp:

(0.9313674490083879+0.2860392292863043j)

12 Execution time: 0:01:50.233181 ovlp:

(0.920045424099933+0.3069288752435255j)

13 Execution time: 0:01:50.243669 ovlp:

(0.9067105947633085+0.33068812751388044j)

14 Execution time: 0:01:50.255293 ovlp:

(0.8904789590537099+0.3511153724538194j)

15 Execution time: 0:01:50.267099 ovlp:

(0.8757297266053985+0.3732494211487265j)

16 Execution time: 0:01:50.278871 ovlp:

(0.8609328940523668+0.3940030668067469j)

17 Execution time: 0:01:50.291695 ovlp:

(0.8451568593450907+0.41644311617485563j)

x_points = [np.float64(0.0), np.float64(0.1608678102802464),

np.float64(0.3217356205604928), np.float64(0.4826034308407392),

np.float64(0.6434712411209856), np.float64(0.8043390514012321),

np.float64(0.9652068616814784), np.float64(1.126074671961725),

np.float64(1.2869424822419713), np.float64(1.4478102925222176),

np.float64(1.6086781028024641), np.float64(1.7695459130827105),

np.float64(1.9304137233629568), np.float64(2.0912815336432033),

np.float64(2.25214934392345), np.float64(2.413017154203696),

np.float64(2.5738849644839426), np.float64(2.734752774764189)] y_points


```

= [1.          +0.j
0.9993539985787969+0.02733946014681243j
0.9977083949584689+0.0525199155438143j
0.9945599880319738+0.08085557788227127j
0.9906091793401945+0.10921164026560848j
0.9860803693768125+0.13365769404692696j
0.9790763539679788+0.16312215886874948j
0.9722151388733056+0.1880442136972702j
0.964061920936226 +0.21423107130835684j
0.9535898978977755+0.23899672579279674j
0.9432946752482856+0.2630755787662733j
0.9313674490083879+0.2860392292863043j
0.920045424099933 +0.3069288752435255j
0.9067105947633085+0.33068812751388044j
0.8904789590537099+0.3511153724538194j
0.8757297266053985+0.3732494211487265j
0.8609328940523668+0.3940030668067469j
0.8451568593450907+0.41644311617485563j]
fit1: [ 0.6321055386869487 -0.26395660017566813]
[ 0.6321055386869487 -0.26395660017566813 0.36789446131305126
-0.          ] 5.330982589854264e-10
[ 4.7340753795057144e-01 -2.9954930260512064e-01
3.4584201815375576e-01
-7.4878713187359322e-02 -9.9083830416354950e-07]
2.3374840659136995e-10
E_gs: -0.29954930260512064
test mps sampling took: (0.001493215560913086, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.12145309312348608
1 Execution time: 0:01:50.772872  ovlp:
(0.999654399447039+0.02153763446021517j)
2 Execution time: 0:01:50.774778  ovlp:
(0.9986703978726366+0.04044006470410344j)
3 Execution time: 0:01:50.778170  ovlp:
(0.9972207955532728+0.06253930006288j)
4 Execution time: 0:01:50.781709  ovlp:
(0.9946575914521463+0.0811729298766879j)
5 Execution time: 0:01:50.786036  ovlp:
(0.9914799863679782+0.10055056088089742j)
6 Execution time: 0:01:50.791385  ovlp:
(0.9883695813913302+0.12182899492639199j)
7 Execution time: 0:01:50.797068  ovlp:
(0.9844095750553201+0.1423106276970043j)
8 Execution time: 0:01:50.803724  ovlp:
(0.9788991662386659+0.15834745335592526j)

```

9 Execution time: 0:01:50.810926 ovlp:
(0.9739887583820135+0.18055708889134214j)

10 Execution time: 0:01:50.818577 ovlp:
(0.9678447485515977+0.20049152078643329j)

11 Execution time: 0:01:50.826192 ovlp:
(0.9605151368242189+0.22092515348024566j)

12 Execution time: 0:01:50.834707 ovlp:
(0.9527391243825991+0.23928998286397252j)

x_points = [np.float64(0.0), np.float64(0.12145309312348608),
np.float64(0.24290618624697216), np.float64(0.36435927937045826),
np.float64(0.4858123724939443), np.float64(0.6072654656174304),
np.float64(0.7287185587409165), np.float64(0.8501716518644026),
np.float64(0.9716247449878886), np.float64(1.0930778381113748),
np.float64(1.2145309312348609), np.float64(1.335984024358347),
np.float64(1.457437117481833)] y_points = [1. +0.j
0.999654399447039 +0.02153763446021517j
0.9986703978726366+0.04044006470410344j
0.9972207955532728+0.06253930006288j
0.9946575914521463+0.0811729298766879j
0.9914799863679782+0.10055056088089742j
0.9883695813913302+0.12182899492639199j
0.9844095750553201+0.1423106276970043j
0.9788991662386659+0.15834745335592526j
0.9739887583820135+0.18055708889134214j
0.9678447485515977+0.20049152078643329j
0.9605151368242189+0.22092515348024566j
0.9527391243825991+0.23928998286397252j]

fit1: [0.6209681204392501 -0.26989190624125453]
[0.6209681204392501 -0.26989190624125453 0.3790318795607499
-0.] 3.856583988630978e-11
[5.2811153964288338e-01 -2.8658522697246031e-01
1.8953170817462114e-01
-8.6436130940050440e-02 3.4790146295348036e-06]
3.8773965810020854e-11
E_gs: -0.2865852269724603

test mps sampling took: (0.0012743473052978516, Counter({0: 6, 2: 4}))

truncated ham size: 10 Number of fitting points: 7

shots per matrix element: 833333.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.11699793026199043

1 Execution time: 0:01:51.280752 ovlp:
(0.99964959985984+0.018793207517282973j)

2 Execution time: 0:01:51.282739 ovlp:
(0.9988047995219198+0.03940681576272631j)

3 Execution time: 0:01:51.285272 ovlp:
(0.9972063988825595+0.058705223482089286j)

4 Execution time: 0:01:51.288344 ovlp:

```

(0.9952479980991993+0.07922763169105274j)
5 Execution time: 0:01:51.292125  ovlp:
(0.9920607968243187+0.09720363888145545j)
6 Execution time: 0:01:51.296303  ovlp:
(0.9891999956799982+0.11807164722865893j)
x_points = [np.float64(0.0), np.float64(0.11699793026199043),
np.float64(0.23399586052398086), np.float64(0.35099379078597126),
np.float64(0.4679917210479617), np.float64(0.5849896513099522),
np.float64(0.7019875815719425)] y_points = [1.          +0.j
0.99964959985984 +0.01879320751728297j
0.9988047995219198+0.03940681576272631j
0.9972063988825595+0.05870522348208929j
0.9952479980991993+0.07922763169105274j
0.9920607968243187+0.09720363888145545j
0.9891999956799982+0.11807164722865893j]
fit1: [ 0.5829839243608843 -0.29242092543117254]
[ 0.5829839243608843 -0.29242092543117254  0.4170160756391157
-0.          ] 1.524744681707838e-11
[ 5.2352453858519887e-01 -2.5205519159854883e-01
3.8214045107335642e-01
-9.8200699055432730e-02  6.5536146064283931e-07]
2.0323151282179286e-11
E_gs: -0.25205519159854883
test mps sampling took: (0.0013613700866699219, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.18692027112433562
1 Execution time: 0:01:51.865929  ovlp:
(0.9990699990699992+0.03187503187503182j)
2 Execution time: 0:01:51.867925  ovlp:
(0.9969519969519969+0.0635430635430636j)
3 Execution time: 0:01:51.870477  ovlp:
(0.992979992979993+0.09291309291309302j)
4 Execution time: 0:01:51.874053  ovlp:
(0.9874719874719875+0.12556512556512556j)
5 Execution time: 0:01:51.877917  ovlp:
(0.980943980943981+0.15269115269115274j)
6 Execution time: 0:01:51.883198  ovlp:
(0.9725199725199725+0.18330918330918333j)
7 Execution time: 0:01:51.889064  ovlp:
(0.9624339624339624+0.21299121299121304j)
8 Execution time: 0:01:51.895173  ovlp:
(0.9508239508239509+0.24267924267924257j)
9 Execution time: 0:01:51.902024  ovlp:
(0.9380859380859381+0.2721812721812722j)
10 Execution time: 0:01:51.909704  ovlp:

```

```

(0.9251619251619252+0.298983298983299j)
11 Execution time: 0:01:51.918767 ovlp:
(0.9084519084519085+0.3282033282033281j)
12 Execution time: 0:01:51.928151 ovlp:
(0.8932418932418933+0.3546393546393547j)
13 Execution time: 0:01:51.939503 ovlp:
(0.8734298734298733+0.37562137562137554j)
14 Execution time: 0:01:51.950944 ovlp:
(0.8541818541818542+0.4039294039294039j)
15 Execution time: 0:01:51.961422 ovlp:
(0.8353718353718353+0.4274194274194274j)
x_points = [np.float64(0.0), np.float64(0.18692027112433562),
np.float64(0.37384054224867125), np.float64(0.5607608133730069),
np.float64(0.7476810844973425), np.float64(0.9346013556216781),
np.float64(1.1215216267460137), np.float64(1.3084418978703494),
np.float64(1.495362168994685), np.float64(1.6822824401190206),
np.float64(1.8692027112433562), np.float64(2.056122982367692),
np.float64(2.2430432534920275), np.float64(2.429963524616363),
np.float64(2.6168837957406987), np.float64(2.8038040668650344)]
y_points = [1.          +0.j
0.9990699990699992+0.03187503187503182j
0.9969519969519969+0.0635430635430636j
0.992979992979993 +0.09291309291309302j
0.9874719874719875+0.12556512556512556j
0.980943980943981 +0.15269115269115274j
0.9725199725199725+0.18330918330918333j
0.9624339624339624+0.21299121299121304j
0.9508239508239509+0.24267924267924257j
0.9380859380859381+0.2721812721812722j
0.9251619251619252+0.298983298983299j
0.9084519084519085+0.3282033282033281j
0.8932418932418933+0.3546393546393547j
0.8734298734298733+0.37562137562137554j
0.8541818541818542+0.4039294039294039j
0.8353718353718353+0.4274194274194274j ]
fit1: [ 0.6316400740521578 -0.2642932890762168]
[ 0.6316400740521578 -0.2642932890762168  0.36835992594784217
-0.          ] 5.855622190079948e-11
[ 5.1306288657027099e-01 -2.8993046720167126e-01
2.9587235325590644e-01
-6.3938387518835862e-02  6.6236300945374412e-06]
7.704095368815717e-11
E_gs: -0.28993046720167126
test mps sampling took: (0.0013394355773925781, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80

```

```

N gate: 172 dt: 0.1913167388153913
1 Execution time: 0:01:52.420448 ovlp:
(0.999136+0.034496000000000008j)
2 Execution time: 0:01:52.422544 ovlp:
(0.9970623999999999+0.061183999999999905j)
3 Execution time: 0:01:52.425701 ovlp:
(0.9927360000000001+0.09447680000000003j)
4 Execution time: 0:01:52.429202 ovlp: (0.9868288000000001+0.128768j)
5 Execution time: 0:01:52.433313 ovlp:
(0.9799168+0.160012800000000007j)
6 Execution time: 0:01:52.438781 ovlp:
(0.9706688000000001+0.19349119999999997j)
7 Execution time: 0:01:52.443978 ovlp:
(0.9606272+0.220960000000000005j)
8 Execution time: 0:01:52.451051 ovlp: (0.9486336+0.2500416000000001j)
9 Execution time: 0:01:52.458239 ovlp:
(0.9353472+0.2806207999999999j)
10 Execution time: 0:01:52.466046 ovlp:
(0.9215359999999999+0.3084928j)
11 Execution time: 0:01:52.473663 ovlp:
(0.9045631999999999+0.33063679999999995j)
12 Execution time: 0:01:52.483601 ovlp:
(0.8864704000000001+0.3613375999999999j)
13 Execution time: 0:01:52.493270 ovlp:
(0.86992+0.385433600000000004j)
14 Execution time: 0:01:52.504464 ovlp:
(0.8494784+0.4087168000000001j)
15 Execution time: 0:01:52.515782 ovlp: (0.827936+0.4343808j)
16 Execution time: 0:01:52.526869 ovlp:
(0.8071104+0.453254400000000006j)
x_points = [np.float64(0.0), np.float64(0.1913167388153913),
np.float64(0.3826334776307826), np.float64(0.5739502164461738),
np.float64(0.7652669552615652), np.float64(0.9565836940769565),
np.float64(1.1479004328923477), np.float64(1.339217171707739),
np.float64(1.5305339105231304), np.float64(1.7218506493385217),
np.float64(1.913167388153913), np.float64(2.104484126969304),
np.float64(2.2958008657846953), np.float64(2.487117604600087),
np.float64(2.678434343415478), np.float64(2.8697510822308696),
np.float64(3.0610678210462607)] y_points = [1.          +0.j
0.999136          +0.034496000000000008j
0.9970623999999999+0.06118399999999991j
0.9927360000000001+0.09447680000000003j
0.9868288000000001+0.128768j
0.9799168          +0.160012800000000007j
0.9706688000000001+0.19349119999999997j
0.9606272          +0.220960000000000005j
0.9486336          +0.25004160000000001j

```

0.9353472 +0.2806207999999999j
0.9215359999999999+0.3084928j
0.9045631999999999+0.33063679999999995j
0.8864704000000001+0.3613375999999999j
0.86992 +0.38543360000000004j
0.8494784 +0.40871680000000001j
0.827936 +0.4343808j
0.8071104 +0.45325440000000006j]
fit1: [0.6326781724124976 -0.26364939678309324]
[0.6326781724124976 -0.26364939678309324 0.3673218275875024
-0.] 6.76519683955009e-10
[5.065934315051364e-01 -2.905629211169264e-01
2.903879782202250e-01
-7.070236319265266e-02 1.030853280523515e-06]
3.303733622543032e-10
E_gs: -0.2905629211169264
test mps sampling took: (0.0013589859008789062, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.03545013089557093
1 Execution time: 0:01:52.956312 ovlp:
(0.99996999997+0.006951006951007033j)
2 Execution time: 0:01:52.958452 ovlp:
(0.9998859998859999+0.013917013917013943j)
3 Execution time: 0:01:52.961008 ovlp:
(0.9996399996399996+0.019359019359019403j)
4 Execution time: 0:01:52.964608 ovlp:
(0.9995499995499995+0.02363102363102354j)
5 Execution time: 0:01:52.968435 ovlp:
(0.9992859992859993+0.03003303003303004j)
6 Execution time: 0:01:52.973114 ovlp:
(0.998937998937999+0.03483303483303479j)
7 Execution time: 0:01:52.978669 ovlp:
(0.9986799986799986+0.04220704220704219j)
8 Execution time: 0:01:52.985160 ovlp:
(0.9981879981879982+0.047199047199047106j)
9 Execution time: 0:01:52.991827 ovlp:
(0.9978099978099979+0.05292305292305288j)
10 Execution time: 0:01:52.998564 ovlp:
(0.9972099972099973+0.05849705849705855j)
11 Execution time: 0:01:53.006058 ovlp:
(0.9964839964839964+0.0674430674430675j)
12 Execution time: 0:01:53.015493 ovlp:
(0.996045996045996+0.07026907026907026j)
13 Execution time: 0:01:53.024288 ovlp:
(0.9952299952299952+0.07755907755907754j)

14 Execution time: 0:01:53.033572 ovlp:
(0.9945999945999946+0.08313308313308321j)

15 Execution time: 0:01:53.043245 ovlp:
(0.9936219936219937+0.08943908943908951j)

x_points = [np.float64(0.0), np.float64(0.03545013089557093),
np.float64(0.07090026179114187), np.float64(0.1063503926867128),
np.float64(0.14180052358228373), np.float64(0.17725065447785465),
np.float64(0.2127007853734256), np.float64(0.24815091626899655),
np.float64(0.28360104716456747), np.float64(0.3190511780601384),
np.float64(0.3545013089557093), np.float64(0.3899514398512803),
np.float64(0.4254015707468512), np.float64(0.4608517016424221),
np.float64(0.4963018325379931), np.float64(0.531751963433564)] y_points
= [1. +0.j
0.99996999997 +0.00695100695100703j
0.9998859998859999+0.01391701391701394j
0.9996399996399996+0.0193590193590194j
0.9995499995499995+0.02363102363102354j
0.9992859992859993+0.03003303003303004j
0.998937998937999 +0.03483303483303479j
0.9986799986799986+0.04220704220704219j
0.9981879981879982+0.04719904719904711j
0.9978099978099979+0.05292305292305288j
0.9972099972099973+0.05849705849705855j
0.9964839964839964+0.0674430674430675j
0.996045996045996 +0.07026907026907026j
0.9952299952299952+0.07755907755907754j
0.9945999945999946+0.08313308313308321j
0.9936219936219937+0.08943908943908951j]

fit1: [0.5823988269215772 -0.29168919074711835]
[0.5823988269215772 -0.29168919074711835 0.4176011730784228
-0.] 2.379266263950706e-11
[5.2379767893778906e-01 -2.5145660165166761e-01
3.8344944720674518e-01
-1.0536693240846619e-01 6.3040643895383955e-07]
1.0508218894920698e-10
E_gs: -0.2514566016516676
test mps sampling took: (0.0015790462493896484, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 18
shots per matrix element: 294117.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.07824850174255728

1 Execution time: 0:01:53.793601 ovlp:
(0.9998367996409592+0.012297827055219424j)

2 Execution time: 0:01:53.795812 ovlp:
(0.999394798668557+0.025721056586324398j)

3 Execution time: 0:01:53.799400 ovlp:
(0.9986739970827936+0.038647885025347106j)

```

4 Execution time: 0:01:53.802807 ovlp:
(0.9977219949883889+0.052064314541492074j)
5 Execution time: 0:01:53.806729 ovlp:
(0.9965387923853433+0.07069635553198217j)
6 Execution time: 0:01:53.811012 ovlp:
(0.9948863887500552+0.0795567750249051j)
7 Execution time: 0:01:53.816000 ovlp:
(0.9935671858478088+0.09257880367336813j)
8 Execution time: 0:01:53.822508 ovlp:
(0.9914251811353985+0.10475083045182698j)
9 Execution time: 0:01:53.829290 ovlp:
(0.9889091756001864+0.11830326026717253j)
10 Execution time: 0:01:53.837052 ovlp:
(0.9865359703791348+0.13352169374772616j)
11 Execution time: 0:01:53.844649 ovlp:
(0.9835847638864805+0.14285811428785133j)
12 Execution time: 0:01:53.854244 ovlp:
(0.9801235562718238+0.15749174648184217j)
13 Execution time: 0:01:53.864103 ovlp:
(0.9769955493902087+0.17101017622238768j)
14 Execution time: 0:01:53.876717 ovlp:
(0.9732827412220306+0.18336580340476738j)
15 Execution time: 0:01:53.892835 ovlp:
(0.9700731341608952+0.19597983115562845j)
16 Execution time: 0:01:53.912140 ovlp:
(0.9652247234943916+0.20619345362559804j)
17 Execution time: 0:01:53.929215 ovlp:
(0.9607775137105301+0.21970508335118333j)
x_points = [np.float64(0.0), np.float64(0.07824850174255728),
np.float64(0.15649700348511456), np.float64(0.23474550522767185),
np.float64(0.3129940069702291), np.float64(0.3912425087127864),
np.float64(0.4694910104553437), np.float64(0.547739512197901),
np.float64(0.6259880139404582), np.float64(0.7042365156830155),
np.float64(0.7824850174255727), np.float64(0.86073351916813),
np.float64(0.9389820209106874), np.float64(1.0172305226532445),
np.float64(1.095479024395802), np.float64(1.173727526138359),
np.float64(1.2519760278809164), np.float64(1.3302245296234738)] y_points
= [1.          +0.j
0.9998367996409592+0.01229782705521942j
0.999394798668557 +0.0257210565863244j
0.9986739970827936+0.03864788502534711j
0.9977219949883889+0.05206431454149207j
0.9965387923853433+0.07069635553198217j
0.9948863887500552+0.0795567750249051j
0.9935671858478088+0.09257880367336813j
0.9914251811353985+0.10475083045182698j
0.9889091756001864+0.11830326026717253j

```


0.9865359703791348+0.13352169374772616j
0.9835847638864805+0.14285811428785133j
0.9801235562718238+0.15749174648184217j
0.9769955493902087+0.17101017622238768j
0.9732827412220306+0.18336580340476738j
0.9700731341608952+0.19597983115562845j
0.9652247234943916+0.20619345362559804j
0.9607775137105301+0.21970508335118333j]
fit1: [0.6379281852379307 -0.26606734119687153]
[0.6379281852379307 -0.26606734119687153 0.3620718147620693
-0.] 2.2318289464469938e-10
[5.1901757138805882e-01 -2.8940532836610389e-01
3.0245956716406264e-01
-6.6006985784047983e-02 1.8704325793213817e-06]
2.1495827608762576e-10
E_gs: -0.2894053283661039
test mps sampling took: (0.0013170242309570312, Counter({2: 8, 0: 2}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.06824707548752666
1 Execution time: 0:01:54.439787 ovlp:
(0.9998991997177593+0.008046022528862995j)
2 Execution time: 0:01:54.441757 ovlp:
(0.9997191992137577+0.02346126569154383j)
3 Execution time: 0:01:54.444277 ovlp:
(0.9990279972783924+0.03493809782667401j)
4 Execution time: 0:01:54.447327 ovlp:
(0.9984951957865482+0.047682133509973745j)
5 Execution time: 0:01:54.451022 ovlp:
(0.9973503925810991+0.05817256288317618j)
6 Execution time: 0:01:54.455182 ovlp:
(0.9961047890934094+0.06939019429254412j)
7 Execution time: 0:01:54.459959 ovlp:
(0.9946791851017183+0.08080942626639365j)
8 Execution time: 0:01:54.465371 ovlp:
(0.9934119815535483+0.09124225547831544j)
9 Execution time: 0:01:54.471311 ovlp:
(0.9921375779852184+0.10258948725056438j)
10 Execution time: 0:01:54.478015 ovlp:
(0.989660771050159+0.11405911936553426j)
11 Execution time: 0:01:54.485174 ovlp:
(0.9871119639134989+0.12598235275058767j)
12 Execution time: 0:01:54.494172 ovlp:
(0.985189558530764+0.13589678051098542j)
13 Execution time: 0:01:54.504111 ovlp:
(0.9822519503054608+0.14701361163811266j)

```

14 Execution time: 0:01:54.513216  ovlp:
(0.9795375427051196+0.16061444972045913j)
15 Execution time: 0:01:54.523042  ovlp:
(0.9773703366369426+0.16803047048531727j)
16 Execution time: 0:01:54.533491  ovlp:
(0.9745263286737202+0.17773609766107334j)
17 Execution time: 0:01:54.544454  ovlp:
(0.9703287169204073+0.19057373360645413j)
18 Execution time: 0:01:54.556224  ovlp:
(0.9662535055098154+0.2016833647134213j)
x_points = [np.float64(0.0), np.float64(0.06824707548752666),
np.float64(0.13649415097505332), np.float64(0.20474122646257997),
np.float64(0.27298830195010665), np.float64(0.3412353774376333),
np.float64(0.40948245292515995), np.float64(0.4777295284126866),
np.float64(0.5459766039002133), np.float64(0.6142236793877399),
np.float64(0.6824707548752666), np.float64(0.7507178303627933),
np.float64(0.8189649058503199), np.float64(0.8872119813378466),
np.float64(0.9554590568253732), np.float64(1.0237061323129),
np.float64(1.0919532078004266), np.float64(1.1602002832879532),
np.float64(1.2284473587754798)] y_points = [1.          +0.j
0.9998991997177593+0.00804602252886299j
0.9997191992137577+0.02346126569154383j
0.9990279972783924+0.03493809782667401j
0.9984951957865482+0.04768213350997375j
0.9973503925810991+0.05817256288317618j
0.9961047890934094+0.06939019429254412j
0.9946791851017183+0.08080942626639365j
0.9934119815535483+0.09124225547831544j
0.9921375779852184+0.10258948725056438j
0.989660771050159 +0.11405911936553426j
0.9871119639134989+0.12598235275058767j
0.985189558530764 +0.13589678051098542j
0.9822519503054608+0.14701361163811266j
0.9795375427051196+0.16061444972045913j
0.9773703366369426+0.16803047048531727j
0.9745263286737202+0.17773609766107334j
0.9703287169204073+0.19057373360645413j
0.9662535055098154+0.2016833647134213j ]
fit1: [ 0.6254766941054142 -0.2672710082412038]
[ 0.6254766941054142 -0.2672710082412038  0.3745233058945858
-0.          ] 1.2054323131134338e-10
[ 5.2082361217401418e-01 -2.8236385107866790e-01
2.9908107509693277e-01
-6.9055845544532229e-02  3.9581274472071008e-06]
1.3415093543023993e-10
E_gs: -0.2823638510786679
test mps sampling took: (0.0013213157653808594, Counter({0: 6, 2: 4}))

```

```

truncated ham size: 10 Number of fitting points: 11
shots per matrix element: 500000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.22135847996221933
1 Execution time: 0:01:55.088504 ovlp:
(0.998928+0.038143999999999956j)
2 Execution time: 0:01:55.090435 ovlp:
(0.9957400000000001+0.07614399999999999j)
3 Execution time: 0:01:55.092941 ovlp: (0.989924+0.11335600000000001j)
4 Execution time: 0:01:55.095987 ovlp:
(0.9821040000000001+0.14734000000000003j)
5 Execution time: 0:01:55.100198 ovlp: (0.973584+0.18089200000000005j)
6 Execution time: 0:01:55.104799 ovlp: (0.9610559999999999+0.217592j)
7 Execution time: 0:01:55.110951 ovlp:
(0.9477960000000001+0.2534639999999999j)
8 Execution time: 0:01:55.116968 ovlp:
(0.9310039999999999+0.2854920000000001j)
9 Execution time: 0:01:55.123084 ovlp: (0.9145479999999999+0.31738j)
10 Execution time: 0:01:55.129802 ovlp:
(0.8954359999999999+0.3513520000000001j)
x_points = [np.float64(0.0), np.float64(0.22135847996221933),
np.float64(0.44271695992443866), np.float64(0.664075439886658),
np.float64(0.8854339198488773), np.float64(1.1067923998110967),
np.float64(1.328150879773316), np.float64(1.5495093597355354),
np.float64(1.7708678396977546), np.float64(1.9922263196599739),
np.float64(2.2135847996221933)] y_points = [1.          +0.j
0.998928      +0.03814399999999996j
0.9957400000000001+0.07614399999999999j
0.989924      +0.11335600000000001j
0.9821040000000001+0.14734000000000003j
0.973584      +0.18089200000000005j
0.9610559999999999+0.217592j
0.9477960000000001+0.2534639999999999j
0.9310039999999999+0.2854920000000001j
0.9145479999999999+0.31738j
0.8954359999999999+0.3513520000000001j ]
fit1: [ 0.6259367369724631 -0.2681337929072616]
[ 0.6259367369724631 -0.2681337929072616  0.3740632630275369
-0.          ] 8.728987819917046e-11
[ 5.0795895343026887e-01 -2.8844846604673852e-01
3.1127374656265061e-01
-6.9616659571158923e-02  2.0365048792324804e-06]
6.006329494770283e-11
E_gs: -0.2884484660467385
test mps sampling took: (0.0013034343719482422, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0

```

```

Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.23523179773855593
1 Execution time: 0:01:55.566051 ovlp:
(0.9986887986887987+0.04091784091784101j)
2 Execution time: 0:01:55.568084 ovlp:
(0.9949663949663949+0.07874027874027867j)
3 Execution time: 0:01:55.570537 ovlp:
(0.9888767888767889+0.11773311773311779j)
4 Execution time: 0:01:55.574188 ovlp:
(0.9804419804419804+0.16004356004356013j)
5 Execution time: 0:01:55.578080 ovlp:
(0.9691603691603692+0.1923879923879923j)
6 Execution time: 0:01:55.582709 ovlp:
(0.9558459558459558+0.23306603306603302j)
7 Execution time: 0:01:55.588323 ovlp:
(0.9410003410003409+0.26954646954646955j)
8 Execution time: 0:01:55.594824 ovlp:
(0.9221463221463222+0.3000605000605001j)
9 Execution time: 0:01:55.602213 ovlp:
(0.904075504075504+0.33506253506253514j)
10 Execution time: 0:01:55.610612 ovlp:
(0.8827090827090827+0.37102377102377093j)
11 Execution time: 0:01:55.619172 ovlp:
(0.858047058047058+0.3991177991177992j)
x_points = [np.float64(0.0), np.float64(0.23523179773855593),
np.float64(0.47046359547711186), np.float64(0.7056953932156678),
np.float64(0.9409271909542237), np.float64(1.1761589886927797),
np.float64(1.4113907864313355), np.float64(1.6466225841698916),
np.float64(1.8818543819084474), np.float64(2.1170861796470035),
np.float64(2.3523179773855594), np.float64(2.587549775124115)] y_points =
[1.          +0.j
0.9986887986887987+0.04091784091784101j
0.9949663949663949+0.07874027874027867j
0.9888767888767889+0.11773311773311779j
0.9804419804419804+0.16004356004356013j
0.9691603691603692+0.1923879923879923j
0.9558459558459558+0.23306603306603302j
0.9410003410003409+0.26954646954646955j
0.9221463221463222+0.3000605000605001j
0.904075504075504 +0.33506253506253514j
0.8827090827090827+0.37102377102377093j
0.858047058047058 +0.3991177991177992j ]
fit1: [ 0.6341884889543938 -0.26446403373207145]
[ 0.6341884889543938 -0.26446403373207145 0.36581151104560616
-0.          ] 1.9002928447292918e-10
[ 5.0651096994378386e-01 -2.9124388915808108e-01
3.0641544332938075e-01

```

-6.7835730845544936e-02 2.6404016838094963e-06]
1.489504371349654e-10
E_gs: -0.2912438891580811
test mps sampling took: (0.0013089179992675781, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2849633447310476
1 Execution time: 0:01:56.068188 ovlp:
(0.9981519981519982+0.05084105084105084j)
2 Execution time: 0:01:56.070222 ovlp:
(0.9925911925911926+0.09597429597429596j)
3 Execution time: 0:01:56.072781 ovlp:
(0.984048384048384+0.14149394149394157j)
4 Execution time: 0:01:56.076516 ovlp:
(0.9715995715995716+0.19253239253239252j)
5 Execution time: 0:01:56.080391 ovlp:
(0.9551355551355551+0.23348243348243347j)
6 Execution time: 0:01:56.085238 ovlp:
(0.9362187362187362+0.27973287973287975j)
7 Execution time: 0:01:56.090642 ovlp:
(0.9144711144711144+0.3231777231777231j)
8 Execution time: 0:01:56.096296 ovlp:
(0.8885990885990886+0.3595581595581596j)
9 Execution time: 0:01:56.103018 ovlp:
(0.8614250614250614+0.3919401919401919j)
10 Execution time: 0:01:56.109811 ovlp:
(0.8317646317646317+0.43312543312543306j)
11 Execution time: 0:01:56.117647 ovlp:
(0.7992901992901993+0.4623742623742624j)
12 Execution time: 0:01:56.126872 ovlp:
(0.7650685650685651+0.4890190890190891j)
13 Execution time: 0:01:56.136634 ovlp:
(0.7278733278733278+0.5152019152019152j)
14 Execution time: 0:01:56.146155 ovlp:
(0.6926100926100927+0.5405279405279406j)
15 Execution time: 0:01:56.156654 ovlp:
(0.6544488544488545+0.5551103551103551j)
16 Execution time: 0:01:56.169074 ovlp:
(0.6118776118776119+0.5762951762951762j)
17 Execution time: 0:01:56.180872 ovlp:
(0.5724227724227724+0.5901131901131902j)
18 Execution time: 0:01:56.194808 ovlp:
(0.5351687351687351+0.5994875994875994j)
19 Execution time: 0:01:56.208718 ovlp:
(0.49331989331989323+0.6053760053760053j)
20 Execution time: 0:01:56.222034 ovlp:

```

(0.45556185556185547+0.608022008022008j)
21 Execution time: 0:01:56.235779 ovlp:
(0.4193158193158193+0.6099120099120099j)
x_points = [np.float64(0.0), np.float64(0.2849633447310476),
np.float64(0.5699266894620952), np.float64(0.8548900341931429),
np.float64(1.1398533789241905), np.float64(1.424816723655238),
np.float64(1.7097800683862858), np.float64(1.9947434131173334),
np.float64(2.279706757848381), np.float64(2.5646701025794285),
np.float64(2.849633447310476), np.float64(3.1345967920415236),
np.float64(3.4195601367725716), np.float64(3.704523481503619),
np.float64(3.9894868262346668), np.float64(4.274450170965714),
np.float64(4.559413515696762), np.float64(4.8443768604278095),
np.float64(5.129340205158857), np.float64(5.414303549889905),
np.float64(5.699266894620952), np.float64(5.984230239352)] y_points =
[1.          +0.j
 0.9981519981519982 +0.05084105084105084j
 0.9925911925911926 +0.09597429597429596j
 0.984048384048384  +0.14149394149394157j
 0.9715995715995716 +0.19253239253239252j
 0.9551355551355551 +0.23348243348243347j
 0.9362187362187362 +0.27973287973287975j
 0.9144711144711144 +0.3231777231777231j
 0.8885990885990886 +0.3595581595581596j
 0.8614250614250614 +0.3919401919401919j
 0.8317646317646317 +0.43312543312543306j
 0.7992901992901993 +0.4623742623742624j
 0.7650685650685651 +0.4890190890190891j
 0.7278733278733278 +0.5152019152019152j
 0.6926100926100927 +0.5405279405279406j
 0.6544488544488545 +0.5551103551103551j
 0.6118776118776119 +0.5762951762951762j
 0.5724227724227724 +0.5901131901131902j
 0.5351687351687351 +0.5994875994875994j
 0.49331989331989323+0.6053760053760053j
 0.45556185556185547+0.608022008022008j
 0.4193158193158193 +0.6099120099120099j ]
fit1: [ 0.621216282952003 -0.2574636017214946]
[ 0.3819018162422187 -0.32097519133012287 0.459469302689394
-0.09681616041482737] 4.478771767293886e-09
[ 0.37778531473893384 -0.3290152040822276 0.38802193489853076
-0.08247853967740014 -0.05374022035308481] 1.0363552676343074e-09
E_gs: -0.3290152040822276
test mps sampling took: (0.0013484954833984375, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.10819368406607684

```

1 Execution time: 0:01:56.755520 ovlp:
(0.9997035989922365+0.018730263682896542j)
2 Execution time: 0:01:56.757453 ovlp:
(0.998958796459908+0.03187830838624861j)
3 Execution time: 0:01:56.760038 ovlp:
(0.997757992377174+0.054739186113232696j)
4 Execution time: 0:01:56.763123 ovlp:
(0.9958579859171521+0.07225724567463532j)
5 Execution time: 0:01:56.766864 ovlp:
(0.9930915765113602+0.09039850735492494j)
6 Execution time: 0:01:56.771045 ovlp:
(0.9905227677774104+0.10854736906105478j)
7 Execution time: 0:01:56.775832 ovlp:
(0.9876879581390576+0.12586782795061513j)
8 Execution time: 0:01:56.781146 ovlp:
(0.9842679465110182+0.14478429226659362j)
9 Execution time: 0:01:56.787066 ovlp:
(0.9792519294565603+0.16350315591073006j)
10 Execution time: 0:01:56.793670 ovlp:
(0.9739015112651384+0.17871840764258606j)
11 Execution time: 0:01:56.801918 ovlp:
(0.9698430974665313+0.19419966027884494j)
12 Execution time: 0:01:56.811295 ovlp:
(0.9641962782673461+0.21737973909111297j)
13 Execution time: 0:01:56.822718 ovlp:
(0.9558514498949295+0.23223018958264463j)
14 Execution time: 0:01:56.832533 ovlp:
(0.9494218280342153+0.2445270313919068j)
15 Execution time: 0:01:56.842293 ovlp:
(0.9410009994033979+0.26131548847266073j)
16 Execution time: 0:01:56.852762 ovlp:
(0.9345789775685238+0.27883354803406335j)
17 Execution time: 0:01:56.863855 ovlp:
(0.9272905527878794+0.2928099955539849j)
18 Execution time: 0:01:56.877808 ovlp:
(0.9176385199709678+0.3120304609035671j)
19 Execution time: 0:01:56.892145 ovlp:
(0.9086628894538242+0.3275345136173462j)
x_points = [np.float64(0.0), np.float64(0.10819368406607684),
np.float64(0.21638736813215367), np.float64(0.3245810521982305),
np.float64(0.43277473626430735), np.float64(0.5409684203303842),
np.float64(0.649162104396461), np.float64(0.7573557884625378),
np.float64(0.8655494725286147), np.float64(0.9737431565946916),
np.float64(1.0819368406607683), np.float64(1.1901305247268452),
np.float64(1.298324208792922), np.float64(1.406517892858999),
np.float64(1.5147115769250756), np.float64(1.6229052609911525),
np.float64(1.7310989450572294), np.float64(1.8392926291233063),

```

np.float64(1.9474863131893831), np.float64(2.05567999725546)] y_points =
[1.          +0.j
 0.9997035989922365+0.01873026368289654j
 0.998958796459908 +0.03187830838624861j
 0.997757992377174 +0.0547391861132327j
 0.9958579859171521+0.07225724567463532j
 0.9930915765113602+0.09039850735492494j
 0.9905227677774104+0.10854736906105478j
 0.9876879581390576+0.12586782795061513j
 0.9842679465110182+0.14478429226659362j
 0.9792519294565603+0.16350315591073006j
 0.9739015112651384+0.17871840764258606j
 0.9698430974665313+0.19419966027884494j
 0.9641962782673461+0.21737973909111297j
 0.9558514498949295+0.23223018958264463j
 0.9494218280342153+0.2445270313919068j
 0.9410009994033979+0.26131548847266073j
 0.9345789775685238+0.27883354803406335j
 0.9272905527878794+0.2928099955539849j
 0.9176385199709678+0.3120304609035671j
 0.9086628894538242+0.3275345136173462j ]
fit1: [ 0.6256536283299831 -0.26774922479866864]
[ 0.6256536283299831 -0.26774922479866864 0.37434637167001694
 -0.          ] 5.280738314474999e-10
[ 5.1843507629063146e-01 -2.9077534324984289e-01
 3.2109908472694226e-01
 -5.3323606732390824e-02 1.3644363415070005e-06]
4.820665958221044e-10
E_gs: -0.2907753432498429
test mps sampling took: (0.0014274120330810547, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.20237794812690663
1 Execution time: 0:01:57.290728 ovlp:
(0.9991659991659991+0.03543903543903548j)
2 Execution time: 0:01:57.293141 ovlp:
(0.9962979962979963+0.07000507000507006j)
3 Execution time: 0:01:57.296514 ovlp:
(0.9919779919779921+0.1006831006831006j)
4 Execution time: 0:01:57.299993 ovlp:
(0.9857739857739858+0.13526113526113526j)
5 Execution time: 0:01:57.304616 ovlp:
(0.9776559776559777+0.16809916809916814j)
6 Execution time: 0:01:57.309850 ovlp:
(0.9674019674019674+0.20114120114120104j)
7 Execution time: 0:01:57.315097 ovlp:

```



```

(0.9563319563319563+0.23327723327723326j)
8 Execution time: 0:01:57.321642  ovlp:
(0.9421419421419421+0.2669612669612669j)
9 Execution time: 0:01:57.328590  ovlp:
(0.9275139275139275+0.296085296085296j)
10 Execution time: 0:01:57.336336  ovlp:
(0.9126579126579126+0.3212433212433212j)
11 Execution time: 0:01:57.344554  ovlp:
(0.8944418944418944+0.3518133518133517j)
12 Execution time: 0:01:57.354355  ovlp:
(0.8737658737658738+0.378069378069378j)
13 Execution time: 0:01:57.363970  ovlp:
(0.8546438546438546+0.40523740523740526j)
14 Execution time: 0:01:57.373579  ovlp:
(0.832947832947833+0.4287034287034288j)
15 Execution time: 0:01:57.385326  ovlp:
(0.8081498081498082+0.45053745053745065j)
x_points = [np.float64(0.0), np.float64(0.20237794812690663),
np.float64(0.40475589625381325), np.float64(0.6071338443807199),
np.float64(0.8095117925076265), np.float64(1.011889740634533),
np.float64(1.2142676887614399), np.float64(1.4166456368883464),
np.float64(1.619023585015253), np.float64(1.8214015331421596),
np.float64(2.023779481269066), np.float64(2.2261574293959727),
np.float64(2.4285353775228797), np.float64(2.6309133256497863),
np.float64(2.833291273776693), np.float64(3.0356692219035994)] y_points
= [1.          +0.j
0.9991659991659991+0.03543903543903548j
0.9962979962979963+0.07000507000507006j
0.9919779919779921+0.1006831006831006j
0.9857739857739858+0.13526113526113526j
0.9776559776559777+0.16809916809916814j
0.9674019674019674+0.20114120114120104j
0.9563319563319563+0.23327723327723326j
0.9421419421419421+0.2669612669612669j
0.9275139275139275+0.296085296085296j
0.9126579126579126+0.3212433212433212j
0.8944418944418944+0.3518133518133517j
0.8737658737658738+0.378069378069378j
0.8546438546438546+0.40523740523740526j
0.832947832947833 +0.4287034287034288j
0.8081498081498082+0.45053745053745065j]
fit1: [ 0.6316980196892631 -0.2645725241277419]
[ 0.6316980196892631 -0.2645725241277419  0.3683019803107369
 -0.          ] 5.231008195851716e-10
[ 4.9435410163604998e-01 -2.9562569737440697e-01
 3.6912269808424725e-01
-6.0075699551919812e-02 -8.3050170625497150e-07]

```

```

1.6002052729250519e-10
E_gs: -0.29562569737440697
test mps sampling took: (0.0012860298156738281, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2034466542140075
1 Execution time: 0:01:57.818763 ovlp:
(0.9990627990627992+0.03444543444543435j)
2 Execution time: 0:01:57.820700 ovlp:
(0.9961719961719961+0.0691570691570691j)
3 Execution time: 0:01:57.823149 ovlp:
(0.9916487916487917+0.10503470503470513j)
4 Execution time: 0:01:57.826210 ovlp:
(0.9858495858495859+0.13557513557513556j)
5 Execution time: 0:01:57.829927 ovlp:
(0.9766711766711766+0.16940676940676935j)
6 Execution time: 0:01:57.834177 ovlp:
(0.9675147675147675+0.20547800547800543j)
7 Execution time: 0:01:57.839004 ovlp:
(0.9560307560307559+0.2346456346456347j)
8 Execution time: 0:01:57.844556 ovlp:
(0.9424479424479424+0.2627176627176626j)
9 Execution time: 0:01:57.850612 ovlp:
(0.9262515262515263+0.29595089595089585j)
10 Execution time: 0:01:57.857137 ovlp:
(0.9115291115291115+0.32609972609972604j)
11 Execution time: 0:01:57.864229 ovlp:
(0.8929786929786929+0.35187495187495177j)
x_points = [np.float64(0.0), np.float64(0.2034466542140075),
np.float64(0.406893308428015), np.float64(0.6103399626420225),
np.float64(0.81378661685603), np.float64(1.0172332710700376),
np.float64(1.220679925284045), np.float64(1.4241265794980527),
np.float64(1.62757323371206), np.float64(1.8310198879260675),
np.float64(2.034466542140075), np.float64(2.2379131963540826)] y_points
= [1.          +0.j
0.9990627990627992+0.03444543444543435j
0.9961719961719961+0.0691570691570691j
0.9916487916487917+0.10503470503470513j
0.9858495858495859+0.13557513557513556j
0.9766711766711766+0.16940676940676935j
0.9675147675147675+0.20547800547800543j
0.9560307560307559+0.2346456346456347j
0.9424479424479424+0.2627176627176626j
0.9262515262515263+0.29595089595089585j
0.9115291115291115+0.32609972609972604j
0.8929786929786929+0.35187495187495177j]

```

fit1: [0.6375960344625468 -0.2636083712604178]
[0.6375960344625468 -0.2636083712604178 0.36240396553745324
-0.] 2.0296423336604686e-10
[5.181409405096628e-01 -2.907352450736481e-01
2.878037810952243e-01
-6.242961365545730e-02 2.462038000740648e-06]
1.6625916473358842e-10
E_gs: -0.2907352450736481
test mps sampling took: (0.0013964176177978516, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.16128975153684066
1 Execution time: 0:01:58.289965 ovlp:
(0.9994895983667147+0.027887289239325597j)
2 Execution time: 0:01:58.291917 ovlp:
(0.9977383927628569+0.05126896406068493j)
3 Execution time: 0:01:58.294417 ovlp:
(0.9947639832447464+0.07758984828751458j)
4 Execution time: 0:01:58.297581 ovlp:
(0.9908479707135063+0.11139075645042062j)
5 Execution time: 0:01:58.301371 ovlp:
(0.9856823541835333+0.13825724242317583j)
6 Execution time: 0:01:58.305607 ovlp:
(0.9782111302756169+0.16640853250730392j)
7 Execution time: 0:01:58.310348 ovlp:
(0.9712591080291457+0.18688619803583362j)
8 Execution time: 0:01:58.315927 ovlp:
(0.9619926783765709+0.21058467387095647j)
9 Execution time: 0:01:58.321851 ovlp:
(0.9544246541588932+0.2377591608293146j)
10 Execution time: 0:01:58.329596 ovlp:
(0.9427646168467738+0.26349044316941805j)
11 Execution time: 0:01:58.338274 ovlp:
(0.9310253792812138+0.2858337146678869j)
12 Execution time: 0:01:58.346519 ovlp:
(0.9183093385898835+0.30947059030588897j)
13 Execution time: 0:01:58.355285 ovlp:
(0.9052324967439895+0.33576507444823833j)
14 Execution time: 0:01:58.364774 ovlp:
(0.8903340490689571+0.3582579464254285j)
15 Execution time: 0:01:58.374417 ovlp:
(0.8758932028582491+0.3764828047449751j)
16 Execution time: 0:01:58.384879 ovlp:
(0.8601939526206483+0.3973036713717484j)
17 Execution time: 0:01:58.396051 ovlp:
(0.8432010982435143+0.41373332394663653j)

```
18 Execution time: 0:01:58.407523  ovlp:
(0.8238850364321166+0.4341053891372453j)
19 Execution time: 0:01:58.419723  ovlp:
(0.8050705762258439+0.4542134534830511j)
20 Execution time: 0:01:58.432548  ovlp:
(0.7878665211728677+0.46851349924319763j)
21 Execution time: 0:01:58.446067  ovlp:
(0.7659632510824035+0.4866679573374635j)
22 Execution time: 0:01:58.460019  ovlp:
(0.7482575944243022+0.5029040092928296j)
x_points = [np.float64(0.0), np.float64(0.16128975153684066),
np.float64(0.32257950307368133), np.float64(0.483869254610522),
np.float64(0.6451590061473627), np.float64(0.8064487576842033),
np.float64(0.967738509221044), np.float64(1.1290282607578845),
np.float64(1.2903180122947253), np.float64(1.451607763831566),
np.float64(1.6128975153684066), np.float64(1.7741872669052472),
np.float64(1.935477018442088), np.float64(2.0967667699789287),
np.float64(2.258056521515769), np.float64(2.41934627305261),
np.float64(2.5806360245894506), np.float64(2.7419257761262914),
np.float64(2.903215527663132), np.float64(3.0645052791999725),
np.float64(3.2257950307368133), np.float64(3.387084782273654),
np.float64(3.5483745338104944)] y_points = [1.          +0.j
0.9994895983667147+0.0278872892393256j
0.9977383927628569+0.05126896406068493j
0.9947639832447464+0.07758984828751458j
0.9908479707135063+0.11139075645042062j
0.9856823541835333+0.13825724242317583j
0.9782111302756169+0.16640853250730392j
0.9712591080291457+0.18688619803583362j
0.9619926783765709+0.21058467387095647j
0.9544246541588932+0.2377591608293146j
0.9427646168467738+0.26349044316941805j
0.9310253792812138+0.2858337146678869j
0.9183093385898835+0.30947059030588897j
0.9052324967439895+0.33576507444823833j
0.8903340490689571+0.3582579464254285j
0.8758932028582491+0.3764828047449751j
0.8601939526206483+0.3973036713717484j
0.8432010982435143+0.41373332394663653j
0.8238850364321166+0.4341053891372453j
0.8050705762258439+0.4542134534830511j
0.7878665211728677+0.46851349924319763j
0.7659632510824035+0.4866679573374635j
0.7482575944243022+0.5029040092928296j ]
fit1: [ 0.629912615405583 -0.2635841429603603]
[ 0.49431139215209147 -0.29523808556633957 0.3831676442648661
-0.05657614715116229] 1.6761887104878877e-09
```

```

[ 0.5107810048993491 -0.2915281491410012  0.3141142234269461
 -0.04986484614331199 -0.01675963500574275] 1.7740633561555332e-09
E_gs: -0.2915281491410012
test mps sampling took: (0.0013155937194824219, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.07908145760740973
1 Execution time: 0:01:59.023914 ovlp:
(0.9998592+0.012793599999999996j)
2 Execution time: 0:01:59.025923 ovlp:
(0.99951680000000001+0.025004800000000005j)
3 Execution time: 0:01:59.028490 ovlp:
(0.9987455999999999+0.039387199999999956j)
4 Execution time: 0:01:59.032074 ovlp:
(0.9977727999999999+0.052780800000000007j)
x_points = [np.float64(0.0), np.float64(0.07908145760740973),
np.float64(0.15816291521481946), np.float64(0.23724437282222918),
np.float64(0.3163258304296389)] y_points = [1.          +0.j
0.9998592      +0.012793599999999996j
0.99951680000000001+0.025004800000000005j
0.9987455999999999+0.039387199999999956j
0.9977727999999999+0.052780800000000007j]
fit1: [ 0.3406960114089918 -0.5115065368935645]
[ 0.3406960114089918 -0.5115065368935645  0.3407060113089918
 -0.          ] 7.99702452795744e-11
[ 2.8976647514753595e-01 -4.3529283661075036e-01
 2.8964975387540898e-01
 -1.6312004668958646e-01  1.5017782434425139e-06]
3.2650321055826726e-11
E_gs: -0.43529283661075036
test mps sampling took: (0.0014219284057617188, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 23
shots per matrix element: 227272.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.12892647323682827
1 Execution time: 0:01:59.455567 ovlp:
(0.999612798760956+0.021366468372698844j)
2 Execution time: 0:01:59.457506 ovlp:
(0.998539195325425+0.04460734274349676j)
3 Execution time: 0:01:59.459965 ovlp:
(0.996787989721567+0.06734661550916954j)
4 Execution time: 0:01:59.462959 ovlp:
(0.9939719807103382+0.08895948467035097j)
5 Execution time: 0:01:59.467167 ovlp:
(0.9906895702066247+0.11028195290224918j)
6 Execution time: 0:01:59.471757 ovlp:

```

```

(0.9865271568869021+0.12795240944771025j)
7 Execution time: 0:01:59.477678 ovlp:
(0.9815639410046113+0.1487996761589636j)
8 Execution time: 0:01:59.483580 ovlp:
(0.97654792495336+0.17296455348657114j)
9 Execution time: 0:01:59.489746 ovlp:
(0.9698423034953711+0.1927206167059734j)
10 Execution time: 0:01:59.496403 ovlp:
(0.9634974831919463+0.21178147770072875j)
11 Execution time: 0:01:59.503612 ovlp:
(0.9554806575381041+0.23108873948396624j)
12 Execution time: 0:01:59.511678 ovlp:
(0.9477894329261853+0.25399521278468096j)
13 Execution time: 0:01:59.520425 ovlp:
(0.9390246048787356+0.27379527614488364j)
14 Execution time: 0:01:59.529548 ovlp:
(0.9299605758738427+0.2910257312823401j)
15 Execution time: 0:01:59.539278 ovlp:
(0.9193653419690944+0.3115737970361505j)
16 Execution time: 0:01:59.549606 ovlp:
(0.9094037100918724+0.328610651554085j)
17 Execution time: 0:01:59.560825 ovlp:
(0.8986764757647225+0.34530430497377584j)
18 Execution time: 0:01:59.572314 ovlp:
(0.8850188320602626+0.363581963462283j)
19 Execution time: 0:01:59.584578 ovlp:
(0.8733675947763033+0.37933401386884436j)
20 Execution time: 0:01:59.597329 ovlp:
(0.8586011475236721+0.39593086697877444j)
21 Execution time: 0:01:59.610864 ovlp:
(0.8465451089443485+0.4152205287056918j)
22 Execution time: 0:01:59.624876 ovlp:
(0.8335474673518954+0.42677496567989026j)
x_points = [np.float64(0.0), np.float64(0.12892647323682827),
np.float64(0.25785294647365653), np.float64(0.3867794197104848),
np.float64(0.5157058929473131), np.float64(0.6446323661841413),
np.float64(0.7735588394209696), np.float64(0.9024853126577979),
np.float64(1.0314117858946261), np.float64(1.1603382591314544),
np.float64(1.2892647323682827), np.float64(1.418191205605111),
np.float64(1.5471176788419392), np.float64(1.6760441520787674),
np.float64(1.8049706253155957), np.float64(1.933897098552424),
np.float64(2.0628235717892522), np.float64(2.1917500450260805),
np.float64(2.3206765182629088), np.float64(2.449602991499737),
np.float64(2.5785294647365653), np.float64(2.7074559379733936),
np.float64(2.836382411210222)] y_points = [1.          +0.j
0.999612798760956 +0.02136646837269884j
0.998539195325425 +0.04460734274349676j

```

0.996787989721567 +0.06734661550916954j
 0.9939719807103382+0.08895948467035097j
 0.9906895702066247+0.11028195290224918j
 0.9865271568869021+0.12795240944771025j
 0.9815639410046113+0.1487996761589636j
 0.97654792495336 +0.17296455348657114j
 0.9698423034953711+0.1927206167059734j
 0.9634974831919463+0.21178147770072875j
 0.9554806575381041+0.23108873948396624j
 0.9477894329261853+0.25399521278468096j
 0.9390246048787356+0.27379527614488364j
 0.9299605758738427+0.2910257312823401j
 0.9193653419690944+0.3115737970361505j
 0.9094037100918724+0.328610651554085j
 0.8986764757647225+0.34530430497377584j
 0.8850188320602626+0.363581963462283j
 0.8733675947763033+0.37933401386884436j
 0.8586011475236721+0.39593086697877444j
 0.8465451089443485+0.4152205287056918j
 0.8335474673518954+0.42677496567989026j]
 fit1: [0.63408872715561 -0.2630970992897138]
 [0.63408872715561 -0.2630970992897138 0.36591127284438996
 -0.] 5.039459810873225e-10
 [5.0767770053217243e-01 -2.9066815697381043e-01
 3.2096561543467794e-01
 -6.2790294256548279e-02 9.6636485937679845e-07]
 2.0995342285532715e-10
 E_gs: -0.29066815697381043
 test mps sampling took: (0.0013179779052734375, Counter({0: 6, 2: 4}))
 truncated ham size: 10 Number of fitting points: 19
 shots per matrix element: 277777.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.053353543414868115
 1 Execution time: 0:01:59.980420 ovlp:
 (0.9999279997983994+0.006685218718612385j)
 2 Execution time: 0:01:59.982278 ovlp:
 (0.9997191992137577+0.020682057909762186j)
 3 Execution time: 0:01:59.984742 ovlp:
 (0.9993303981251147+0.025340470953318706j)
 4 Execution time: 0:01:59.988158 ovlp:
 (0.9988695968348711+0.035283698794356555j)
 5 Execution time: 0:01:59.991805 ovlp:
 (0.9983871954841474+0.04429092401458723j)
 6 Execution time: 0:01:59.996923 ovlp:
 (0.9977967938310228+0.05383095072666211j)
 7 Execution time: 0:02:00.002286 ovlp:
 (0.996824791109415+0.06122537143104001j)

```

8 Execution time: 0:02:00.007897 ovlp:
(0.9960687889926092+0.06987979566342783j)
9 Execution time: 0:02:00.014007 ovlp:
(0.995017586049241+0.0836246341489757j)
10 Execution time: 0:02:00.021797 ovlp:
(0.9936567822389903+0.08898144914805761j)
11 Execution time: 0:02:00.030162 ovlp:
(0.9923463785698601+0.09647667013467642j)
12 Execution time: 0:02:00.038502 ovlp:
(0.9910287748805697+0.10724070027396082j)
13 Execution time: 0:02:00.048217 ovlp:
(0.9889695691147935+0.11829273121964734j)
14 Execution time: 0:02:00.058736 ovlp:
(0.9877383656674239+0.12308794464624495j)
15 Execution time: 0:02:00.068432 ovlp:
(0.9853767590549254+0.13599038077306624j)
16 Execution time: 0:02:00.079021 ovlp:
(0.9838575548011534+0.14198079754623305j)
17 Execution time: 0:02:00.092021 ovlp:
(0.9817695489547371+0.14721521220259426j)
18 Execution time: 0:02:00.103939 ovlp:
(0.979847143572002+0.16040564913581767j)
x_points = [np.float64(0.0), np.float64(0.053353543414868115),
np.float64(0.10670708682973623), np.float64(0.16006063024460435),
np.float64(0.21341417365947246), np.float64(0.26676771707434055),
np.float64(0.3201212604892087), np.float64(0.37347480390407684),
np.float64(0.4268283473189449), np.float64(0.480181890733813),
np.float64(0.5335354341486811), np.float64(0.5868889775635493),
np.float64(0.6402425209784174), np.float64(0.6935960643932855),
np.float64(0.7469496078081537), np.float64(0.8003031512230218),
np.float64(0.8536566946378898), np.float64(0.9070102380527579),
np.float64(0.960363781467626)] y_points = [1.          +0.j
0.9999279997983994+0.00668521871861238j
0.9997191992137577+0.02068205790976219j
0.9993303981251147+0.02534047095331871j
0.9988695968348711+0.03528369879435655j
0.9983871954841474+0.04429092401458723j
0.9977967938310228+0.05383095072666211j
0.996824791109415 +0.06122537143104001j
0.9960687889926092+0.06987979566342783j
0.995017586049241 +0.0836246341489757j
0.9936567822389903+0.08898144914805761j
0.9923463785698601+0.09647667013467642j
0.9910287748805697+0.10724070027396082j
0.9889695691147935+0.11829273121964734j
0.9877383656674239+0.12308794464624495j
0.9853767590549254+0.13599038077306624j

```


0.9838575548011534+0.14198079754623305j
0.9817695489547371+0.14721521220259426j
0.979847143572002 +0.16040564913581767j]
fit1: [0.6155779790376078 -0.27297573914007633]
[0.6155779790376078 -0.27297573914007633 0.3844220209623922
-0.] 2.4381484833805307e-10
[5.2034247148555623e-01 -2.7694208898094286e-01
3.0442176851193986e-01
-7.8124095710565888e-02 2.8794447988007341e-06]
2.84855893625475e-10
E_gs: -0.27694208898094286
test mps sampling took: (0.0013117790222167969, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.07234053258759938
1 Execution time: 0:02:00.607417 ovlp:
(0.9998935997446394+0.010505625213500513j)
2 Execution time: 0:02:00.609321 ovlp:
(0.9995295988710373+0.026465663517592386j)
3 Execution time: 0:02:00.611814 ovlp:
(0.9990031976076743+0.03711128906709371j)
4 Execution time: 0:02:00.614895 ovlp:
(0.9980175952422286+0.05052332125597103j)
5 Execution time: 0:02:00.618603 ovlp:
(0.9970599929439832+0.061236146966752614j)
6 Execution time: 0:02:00.622816 ovlp:
(0.995827989987176+0.07348337636010327j)
7 Execution time: 0:02:00.627558 ovlp:
(0.9944727867346881+0.08529940471857134j)
8 Execution time: 0:02:00.633164 ovlp:
(0.992719982527958+0.09645463149111566j)
9 Execution time: 0:02:00.639319 ovlp:
(0.9908159779583472+0.11039306494335577j)
10 Execution time: 0:02:00.645947 ovlp:
(0.9887775730661754+0.12072508974021545j)
11 Execution time: 0:02:00.653145 ovlp:
(0.985781565875758+0.13298911917388612j)
12 Execution time: 0:02:00.661187 ovlp:
(0.9831607595858229+0.1442283461480307j)
13 Execution time: 0:02:00.669966 ovlp:
(0.9802039524894859+0.15424677019224853j)
14 Execution time: 0:02:00.681038 ovlp:
(0.97740954578291+0.16741240178976424j)
x_points = [np.float64(0.0), np.float64(0.07234053258759938),
np.float64(0.14468106517519877), np.float64(0.21702159776279817),
np.float64(0.28936213035039754), np.float64(0.3617026629379969),

```

np.float64(0.43404319552559634), np.float64(0.5063837281131957),
np.float64(0.5787242607007951), np.float64(0.6510647932883945),
np.float64(0.7234053258759938), np.float64(0.7957458584635932),
np.float64(0.8680863910511927), np.float64(0.940426923638792),
np.float64(1.0127674562263913)] y_points = [1.          +0.j
0.9998935997446394+0.01050562521350051j
0.9995295988710373+0.02646566351759239j
0.9990031976076743+0.03711128906709371j
0.9980175952422286+0.05052332125597103j
0.9970599929439832+0.06123614696675261j
0.995827989987176 +0.07348337636010327j
0.9944727867346881+0.08529940471857134j
0.992719982527958 +0.09645463149111566j
0.9908159779583472+0.11039306494335577j
0.9887775730661754+0.12072508974021545j
0.985781565875758 +0.13298911917388612j
0.9831607595858229+0.1442283461480307j
0.9802039524894859+0.15424677019224853j
0.97740954578291 +0.16741240178976424j]
fit1: [ 0.5963379017122638 -0.2819862014378648]
[ 0.5963379017122638 -0.2819862014378648  0.40366209828773625
-0.          ] 4.568688549520105e-11
[ 4.8799590155548223e-01 -2.8494008314127628e-01
3.1891459126888849e-01
-9.0656113567354799e-02  3.0795342817315723e-06]
4.6203720353497206e-11
E_gs: -0.2849400831412763
test mps sampling took: (0.0012950897216796875, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.16923234081289384
1 Execution time: 0:02:01.225463 ovlp:
(0.9993531993531994+0.030003430003429976j)
2 Execution time: 0:02:01.227421 ovlp:
(0.9973063973063974+0.05388745388745386j)
3 Execution time: 0:02:01.229862 ovlp:
(0.9943215943215944+0.08685468685468689j)
4 Execution time: 0:02:01.232901 ovlp:
(0.9895195895195896+0.11299831299831298j)
5 Execution time: 0:02:01.236643 ovlp:
(0.983930783930784+0.14234794234794235j)
6 Execution time: 0:02:01.240800 ovlp:
(0.9772639772639773+0.16857556857556855j)
7 Execution time: 0:02:01.245548 ovlp:
(0.9693819693819694+0.19604919604919613j)
x_points = [np.float64(0.0), np.float64(0.16923234081289384),

```

```

np.float64(0.3384646816257877), np.float64(0.5076970224386815),
np.float64(0.6769293632515754), np.float64(0.8461617040644692),
np.float64(1.015394044877363), np.float64(1.1846263856902568)] y_points
= [1.          +0.j
0.9993531993531994+0.03000343000342998j
0.9973063973063974+0.05388745388745386j
0.9943215943215944+0.08685468685468689j
0.9895195895195896+0.11299831299831298j
0.983930783930784 +0.14234794234794235j
0.9772639772639773+0.16857556857556855j
0.9693819693819694+0.19604919604919613j]
fit1: [ 0.5951318856860297 -0.2828315120736569]
[ 0.5951318856860297 -0.2828315120736569  0.4048681143139703
-0.          ] 7.38659222292485e-11
[ 5.2141375904691023e-01 -2.5582473658325416e-01
3.6467387888623781e-01
-9.6459890767343376e-02  8.6170843836244323e-07]
4.089857349533379e-10
E_gs: -0.25582473658325416
test mps sampling took: (0.0013437271118164062, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.10164701199606514
1 Execution time: 0:02:01.985065 ovlp:
(0.9997359997359998+0.015159015159015077j)
2 Execution time: 0:02:01.987444 ovlp:
(0.9990639990639991+0.030579030579030553j)
3 Execution time: 0:02:01.990115 ovlp:
(0.9980499980499979+0.04833904833904823j)
4 Execution time: 0:02:01.993953 ovlp:
(0.9963939963939963+0.07028107028107033j)
5 Execution time: 0:02:01.997693 ovlp:
(0.9944379944379944+0.08468708468708463j)
6 Execution time: 0:02:02.003147 ovlp:
(0.9915999915999916+0.10056910056910051j)
7 Execution time: 0:02:02.008785 ovlp:
(0.9884019884019883+0.11593511593511585j)
8 Execution time: 0:02:02.015535 ovlp:
(0.9851199851199852+0.13598713598713608j)
9 Execution time: 0:02:02.022409 ovlp:
(0.9813699813699814+0.15332115332115337j)
10 Execution time: 0:02:02.029787 ovlp:
(0.9772479772479772+0.17054117054117057j)
11 Execution time: 0:02:02.038453 ovlp:
(0.9726699726699726+0.18510318510318502j)
12 Execution time: 0:02:02.049266 ovlp:

```

```

(0.9668319668319669+0.20477720477720474j)
13 Execution time: 0:02:02.059180  ovlp:
(0.9609279609279608+0.22067722067722073j)
14 Execution time: 0:02:02.068578  ovlp:
(0.9560619560619561+0.23315723315723313j)
15 Execution time: 0:02:02.080995  ovlp:
(0.9510639510639511+0.24896724896724898j)
x_points = [np.float64(0.0), np.float64(0.10164701199606514),
np.float64(0.20329402399213028), np.float64(0.30494103598819544),
np.float64(0.40658804798426057), np.float64(0.5082350599803257),
np.float64(0.6098820719763909), np.float64(0.711529083972456),
np.float64(0.8131760959685211), np.float64(0.9148231079645863),
np.float64(1.0164701199606514), np.float64(1.1181171319567165),
np.float64(1.2197641439527818), np.float64(1.3214111559488468),
np.float64(1.423058167944912), np.float64(1.5247051799409772)] y_points =
[1.          +0.j
0.9997359997359998+0.01515901515901508j
0.9990639990639991+0.03057903057903055j
0.9980499980499979+0.04833904833904823j
0.9963939963939963+0.07028107028107033j
0.9944379944379944+0.08468708468708463j
0.9915999915999916+0.10056910056910051j
0.9884019884019883+0.11593511593511585j
0.9851199851199852+0.13598713598713608j
0.9813699813699814+0.15332115332115337j
0.9772479772479772+0.17054117054117057j
0.9726699726699726+0.18510318510318502j
0.9668319668319669+0.20477720477720474j
0.9609279609279608+0.22067722067722073j
0.9560619560619561+0.23315723315723313j
0.9510639510639511+0.24896724896724898j]
fit1: [ 0.6364681875438968 -0.26468122941786865]
[ 0.6364681875438968 -0.26468122941786865 0.3635318124561032
-0.          ] 2.7927983718843854e-10
[ 5.3994063901684564e-01 -2.7885155524612637e-01
2.5738520012472388e-01
-7.0744646259561936e-02 8.3057743275054261e-06]
3.0246247412787243e-10
E_gs: -0.27885155524612637
test mps sampling took: (0.0013506412506103516, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.15440783931596103
1 Execution time: 0:02:02.487231  ovlp:
(0.9993503984409562+0.026583263799833112j)
2 Execution time: 0:02:02.489152  ovlp:

```

```

(0.9980175952422286+0.050153720368928845j)
3 Execution time: 0:02:02.491618 ovlp:
(0.9949543878905309+0.07972179133229917j)
4 Execution time: 0:02:02.494716 ovlp:
(0.991499179598031+0.10268184643643141j)
5 Execution time: 0:02:02.498311 ovlp:
(0.9862631670316009+0.12844750827401996j)
6 Execution time: 0:02:02.502641 ovlp:
(0.9809767543442105+0.15527717266521446j)
7 Execution time: 0:02:02.507389 ovlp:
(0.9742679382430517+0.17635562325349574j)
8 Execution time: 0:02:02.513148 ovlp:
(0.9654591171018811+0.20365568877365314j)
9 Execution time: 0:02:02.528473 ovlp:
(0.9566222958935102+0.22661574387778538j)
10 Execution time: 0:02:02.542815 ovlp:
(0.9475222740534577+0.2509030021672052j)
11 Execution time: 0:02:02.554616 ovlp:
(0.935577445385869+0.2747590594217426j)
12 Execution time: 0:02:02.563807 ovlp:
(0.9258670220808529+0.2985199164477994j)
13 Execution time: 0:02:02.573131 ovlp:
(0.9126565903758168+0.32337277609466253j)
14 Execution time: 0:02:02.583390 ovlp:
(0.900336560807746+0.33928801429123423j)
x_points = [np.float64(0.0), np.float64(0.15440783931596103),
np.float64(0.30881567863192205), np.float64(0.4632235179478831),
np.float64(0.6176313572638441), np.float64(0.7720391965798051),
np.float64(0.9264470358957662), np.float64(1.080854875211727),
np.float64(1.2352627145276882), np.float64(1.3896705538436493),
np.float64(1.5440783931596103), np.float64(1.6984862324755712),
np.float64(1.8528940717915323), np.float64(2.0073019111074935),
np.float64(2.161709750423454)] y_points = [1.          +0.j
0.9993503984409562+0.02658326379983311j
0.9980175952422286+0.05015372036892884j
0.9949543878905309+0.07972179133229917j
0.991499179598031 +0.10268184643643141j
0.9862631670316009+0.12844750827401996j
0.9809767543442105+0.15527717266521446j
0.9742679382430517+0.17635562325349574j
0.9654591171018811+0.20365568877365314j
0.9566222958935102+0.22661574387778538j
0.9475222740534577+0.2509030021672052j
0.935577445385869 +0.2747590594217426j
0.9258670220808529+0.2985199164477994j
0.9126565903758168+0.32337277609466253j
0.900336560807746 +0.33928801429123423j]

```

```

fit1: [ 0.6315611662658882 -0.26489168268640134]
[ 0.6315611662658882 -0.26489168268640134 0.3684388337341118
-0.          ] 1.3675225498926351e-10
[ 5.0915612857935966e-01 -2.8825815499301505e-01
2.9328406918709210e-01
-7.1881478846936381e-02 2.1003341388220472e-06]
1.705811529999385e-10
E_gs: -0.28825815499301505
test mps sampling took: (0.0012848377227783203, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 15
shots per matrix element: 357142.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2578924905186287
1 Execution time: 0:02:02.977991 ovlp:
(0.9986447967475123+0.0412832990799179j)
2 Execution time: 0:02:02.979920 ovlp:
(0.9936607847858834+0.08860341264819027j)
3 Execution time: 0:02:02.982967 ovlp:
(0.9863919673407215+0.1288843093223424j)
4 Execution time: 0:02:02.986251 ovlp:
(0.9755727413745794+0.17007240817377967j)
5 Execution time: 0:02:02.990922 ovlp:
(0.9629895111748268+0.21062210549305327j)
6 Execution time: 0:02:02.995917 ovlp:
(0.9480822753974609+0.2518326043982506j)
7 Execution time: 0:02:03.001466 ovlp:
(0.9286838288411892+0.29004149609959073j)
8 Execution time: 0:02:03.008360 ovlp:
(0.9082773798657118+0.3274663859193263j)
9 Execution time: 0:02:03.014758 ovlp:
(0.8846229230950153+0.3630768713844914j)
10 Execution time: 0:02:03.021620 ovlp:
(0.8594060625745501+0.39829535590885423j)
11 Execution time: 0:02:03.028878 ovlp:
(0.8325035980086353+0.42946503071607367j)
12 Execution time: 0:02:03.038013 ovlp:
(0.802773126655504+0.4573418976205543j)
13 Execution time: 0:02:03.047645 ovlp:
(0.771693052063325+0.4813883553320528j)
14 Execution time: 0:02:03.057613 ovlp:
(0.7401873764497036+0.5073948177475627j)
x_points = [np.float64(0.0), np.float64(0.2578924905186287),
np.float64(0.5157849810372575), np.float64(0.7736774715558862),
np.float64(1.031569962074515), np.float64(1.2894624525931437),
np.float64(1.5473549431117724), np.float64(1.805247433630401),
np.float64(2.06313992414903), np.float64(2.3210324146676586),
np.float64(2.5789249051862875), np.float64(2.836817395704916),

```

```

np.float64(3.0947098862235447), np.float64(3.3526023767421735),
np.float64(3.610494867260802)] y_points = [1.          +0.j
0.9986447967475123+0.0412832990799179j
0.9936607847858834+0.08860341264819027j
0.9863919673407215+0.1288843093223424j
0.9755727413745794+0.17007240817377967j
0.9629895111748268+0.21062210549305327j
0.9480822753974609+0.2518326043982506j
0.9286838288411892+0.29004149609959073j
0.9082773798657118+0.3274663859193263j
0.8846229230950153+0.3630768713844914j
0.8594060625745501+0.39829535590885423j
0.8325035980086353+0.42946503071607367j
0.802773126655504 +0.4573418976205543j
0.771693052063325 +0.4813883553320528j
0.7401873764497036+0.5073948177475627j ]
fit1: [ 0.6276645721291146 -0.26339265081603047]
[ 0.5876756963650894 -0.2723860860309251  0.3723345585140878
-0.01567526203158296] 4.760851517735825e-10
[ 0.4940838291037511 -0.2954271564954487  0.3191437255219743
-0.05728239675305878 -0.01520698754520293] 1.5129947687278312e-10
E_gs: -0.2954271564954487
test mps sampling took: (0.0012936592102050781, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.27765814211465184
1 Execution time: 0:02:03.404520 ovlp:
(0.9982016+0.04665919999999999j)
2 Execution time: 0:02:03.406486 ovlp:
(0.99308480000000001+0.09283519999999999j)
3 Execution time: 0:02:03.409041 ovlp:
(0.984288+0.139472000000000004j)
4 Execution time: 0:02:03.412665 ovlp:
(0.9728896+0.186239999999999996j)
5 Execution time: 0:02:03.416550 ovlp:
(0.9565792+0.226768000000000008j)
6 Execution time: 0:02:03.421639 ovlp:
(0.9404032+0.270265600000000001j)
7 Execution time: 0:02:03.426973 ovlp: (0.9185504+0.3120128j)
8 Execution time: 0:02:03.432603 ovlp:
(0.89421440000000001+0.350902400000000006j)
x_points = [np.float64(0.0), np.float64(0.27765814211465184),
np.float64(0.5553162842293037), np.float64(0.8329744263439556),
np.float64(1.1106325684586074), np.float64(1.3882907105732591),
np.float64(1.6659488526879112), np.float64(1.943606994802563),
np.float64(2.2212651369172147)] y_points = [1.          +0.j

```

```

0.9982016      +0.0466591999999999j
0.9930848000000001+0.0928351999999999j
0.984288      +0.139472000000000004j
0.9728896     +0.186239999999999996j
0.9565792     +0.226768000000000008j
0.9404032     +0.270265600000000001j
0.9185504     +0.3120128j
0.89421440000000001+0.350902400000000006j]
fit1: [ 0.6343120898676287 -0.2652069064520642]
[ 0.6343120898676287 -0.2652069064520642  0.36568791013237134
-0.          ] 2.5902857329346617e-11
[ 5.229017582461201e-01 -2.849837064770683e-01
2.983615198183877e-01
-6.514772113859622e-02  1.977415730161290e-06]
3.5784937315165124e-11
E_gs: -0.2849837064770683
test mps sampling took: (0.0012536048889160156, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.256031048854109
1 Execution time: 0:02:03.898833 ovlp:
(0.9986176+0.038617600000000003j)
2 Execution time: 0:02:03.900921 ovlp:
(0.9938624+0.084396799999999994j)
3 Execution time: 0:02:03.903476 ovlp:
(0.9871296+0.128678400000000008j)
4 Execution time: 0:02:03.907144 ovlp:
(0.9761599999999999+0.16927359999999999j)
5 Execution time: 0:02:03.911072 ovlp:
(0.9639359999999999+0.210976000000000005j)
6 Execution time: 0:02:03.915945 ovlp:
(0.9493567999999999+0.250419200000000006j)
7 Execution time: 0:02:03.921403 ovlp:
(0.9301759999999999+0.2892416j)
8 Execution time: 0:02:03.927065 ovlp:
(0.909856+0.326675199999999994j)
9 Execution time: 0:02:03.933420 ovlp: (0.886368+0.3611392j)
10 Execution time: 0:02:03.940039 ovlp:
(0.8609983999999999+0.3937792j)
11 Execution time: 0:02:03.947480 ovlp:
(0.8364288+0.425017600000000001j)
12 Execution time: 0:02:03.955647 ovlp:
(0.8048063999999999+0.452486399999999996j)
13 Execution time: 0:02:03.965264 ovlp:
(0.775584+0.483052800000000006j)
14 Execution time: 0:02:03.974793 ovlp:

```



```

(0.7434495999999999+0.5079552j)
15 Execution time: 0:02:03.987422 ovlp:
(0.7092480000000001+0.5273216000000001j)
16 Execution time: 0:02:03.999698 ovlp:
(0.6754560000000001+0.5472256j)
x_points = [np.float64(0.0), np.float64(0.256031048854109),
np.float64(0.512062097708218), np.float64(0.768093146562327),
np.float64(1.024124195416436), np.float64(1.2801552442705448),
np.float64(1.536186293124654), np.float64(1.792217341978763),
np.float64(2.048248390832872), np.float64(2.304279439686981),
np.float64(2.5603104885410897), np.float64(2.816341537395199),
np.float64(3.072372586249308), np.float64(3.3284036351034167),
np.float64(3.584434683957526), np.float64(3.840465732811635),
np.float64(4.096496781665744)] y_points = [1.          +0.j
0.9986176      +0.03861760000000003j
0.9938624      +0.08439679999999999j
0.9871296      +0.12867840000000008j
0.9761599999999999+0.1692735999999999j
0.9639359999999999+0.21097600000000005j
0.9493567999999999+0.25041920000000006j
0.9301759999999999+0.2892416j
0.909856      +0.32667519999999994j
0.886368      +0.3611392j
0.8609983999999999+0.3937792j
0.8364288      +0.42501760000000001j
0.8048063999999999+0.45248639999999996j
0.775584      +0.48305280000000006j
0.7434495999999999+0.5079552j
0.7092480000000001+0.5273216000000001j
0.6754560000000001+0.5472256j      ]
fit1: [ 0.6276060844807257 -0.26242534498114295]
[ 0.5749711549068897 -0.2744616917394377  0.3736423873738849
-0.02102359016106532] 1.0215539394964358e-09
[ 0.45891785985380074 -0.3026263342974825  0.35380599646391736
-0.07351164359153348 -0.01289568915534082] 2.2173408282692888e-10
E_gs: -0.3026263342974825
test mps sampling took: (0.0012989044189453125, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.12233151603016691
1 Execution time: 0:02:04.450698 ovlp:
(0.9996875996875998+0.01703461703461695j)
2 Execution time: 0:02:04.452827 ovlp:
(0.9987195987195987+0.04051744051744044j)
3 Execution time: 0:02:04.456336 ovlp:
(0.997104797104797+0.06262746262746255j)

```

```

4 Execution time: 0:02:04.459763 ovlp:
(0.9947023947023947+0.08061908061908052j)
5 Execution time: 0:02:04.463646 ovlp:
(0.9914683914683915+0.1006919006919007j)
6 Execution time: 0:02:04.468334 ovlp:
(0.9879131879131879+0.12274032274032276j)
7 Execution time: 0:02:04.473920 ovlp:
(0.9839487839487839+0.14331474331474325j)
8 Execution time: 0:02:04.480461 ovlp:
(0.9789327789327789+0.16262636262636265j)
9 Execution time: 0:02:04.486912 ovlp:
(0.9732567732567732+0.18339878339878335j)
10 Execution time: 0:02:04.494449 ovlp:
(0.9673431673431674+0.20075240075240086j)
11 Execution time: 0:02:04.502051 ovlp:
(0.9599643599643599+0.2226116226116226j)
x_points = [np.float64(0.0), np.float64(0.12233151603016691),
np.float64(0.24466303206033382), np.float64(0.36699454809050075),
np.float64(0.48932606412066765), np.float64(0.6116575801508346),
np.float64(0.7339890961810015), np.float64(0.8563206122111684),
np.float64(0.9786521282413353), np.float64(1.1009836442715022),
np.float64(1.2233151603016692), np.float64(1.345646676331836)] y_points =
[1.          +0.j
0.9996875996875998+0.01703461703461695j
0.9987195987195987+0.04051744051744044j
0.997104797104797 +0.06262746262746255j
0.9947023947023947+0.08061908061908052j
0.9914683914683915+0.1006919006919007j
0.9879131879131879+0.12274032274032276j
0.9839487839487839+0.14331474331474325j
0.9789327789327789+0.16262636262636265j
0.9732567732567732+0.18339878339878335j
0.9673431673431674+0.20075240075240086j
0.9599643599643599+0.2226116226116226j ]
fit1: [ 0.6243427038914314 -0.26877888748280926]
[ 0.6243427038914314 -0.26877888748280926 0.3756572961085686
-0.          ] 8.65464446358247e-11
[ 5.1598107329183951e-01 -2.7618856039098977e-01
3.2654492561381732e-01
-7.8759060021613300e-02 1.2621633110918846e-06]
1.6575086995696843e-10
E_gs: -0.27618856039098977
test mps sampling took: (0.0013005733489990234, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.11235505414087198

```

```

1 Execution time: 0:02:04.956827 ovlp:
(0.9996959999999999+0.018652799999999914j)
2 Execution time: 0:02:04.958756 ovlp: (0.99884+0.03825919999999994j)
3 Execution time: 0:02:04.961183 ovlp:
(0.9974016000000001+0.056425600000000076j)
4 Execution time: 0:02:04.964202 ovlp:
(0.9954752+0.0746960000000001j)
x_points = [np.float64(0.0), np.float64(0.11235505414087198),
np.float64(0.22471010828174395), np.float64(0.3370651624226159),
np.float64(0.4494202165634879)] y_points = [1.          +0.j
0.9996959999999999+0.01865279999999991j
0.99884          +0.03825919999999994j
0.9974016000000001+0.05642560000000008j
0.9954752        +0.0746960000000001j ]
fit1: [ 0.5866247557847458 -0.29328616838505145]
[ 0.5866247557847458 -0.29328616838505145 0.4133752442152542
-0.          ] 2.116057532257835e-11
[ 5.244789706747998e-01 -2.509442410216499e-01
3.775578048629979e-01
-1.059969230061470e-01 6.729869693694637e-07]
1.979306725795814e-11
E_gs: -0.2509442410216499
test mps sampling took: (0.0013756752014160156, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 9
shots per matrix element: 625000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.15978690676881632
1 Execution time: 0:02:05.408550 ovlp:
(0.9994208+0.026486400000000002j)
2 Execution time: 0:02:05.410784 ovlp:
(0.9978528+0.05354879999999995j)
3 Execution time: 0:02:05.414191 ovlp:
(0.9947455999999999+0.08365439999999999j)
4 Execution time: 0:02:05.417440 ovlp:
(0.9910559999999999+0.10770879999999994j)
5 Execution time: 0:02:05.421179 ovlp: (0.985344+0.13424640000000001j)
6 Execution time: 0:02:05.425438 ovlp:
(0.9795872000000001+0.15975999999999999j)
7 Execution time: 0:02:05.430477 ovlp:
(0.9726368000000001+0.18594240000000006j)
8 Execution time: 0:02:05.435861 ovlp:
(0.9645248+0.21116160000000006j)
x_points = [np.float64(0.0), np.float64(0.15978690676881632),
np.float64(0.31957381353763264), np.float64(0.47936072030644894),
np.float64(0.6391476270752653), np.float64(0.7989345338440816),
np.float64(0.9587214406128979), np.float64(1.1185083473817143),
np.float64(1.2782952541505306)] y_points = [1.          +0.j

```

0.9994208 +0.02648640000000002j
0.9978528 +0.05354879999999995j
0.9947455999999999+0.0836543999999999j
0.9910559999999999+0.10770879999999994j
0.985344 +0.13424640000000001j
0.9795872000000001+0.1597599999999999j
0.9726368000000001+0.18594240000000006j
0.9645248 +0.21116160000000006j]
fit1: [0.6165776787122929 -0.27450899886981367]
[0.6165776787122929 -0.27450899886981367 0.38342232128770715
-0.] 4.4807352522492105e-11
[5.3444848937918576e-01 -2.6317551245631521e-01
3.3311441615829562e-01
-8.5754412640951849e-02 1.2985167965581707e-06]
2.2197048811620293e-10
E_gs: -0.2631755124563152
test mps sampling took: (0.0012888908386230469, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.21065846102687621
1 Execution time: 0:02:05.954546 ovlp:
(0.9991104+0.03537279999999998j)
2 Execution time: 0:02:05.956432 ovlp:
(0.9958975999999999+0.06881920000000008j)
3 Execution time: 0:02:05.958904 ovlp:
(0.9910783999999999+0.10326400000000002j)
4 Execution time: 0:02:05.961904 ovlp:
(0.9844096+0.14082560000000001j)
5 Execution time: 0:02:05.965460 ovlp: (0.975552+0.17637119999999995j)
6 Execution time: 0:02:05.969629 ovlp:
(0.9645695999999999+0.2067391999999999j)
7 Execution time: 0:02:05.974314 ovlp:
(0.9524736+0.24554239999999994j)
8 Execution time: 0:02:05.979752 ovlp:
(0.9388479999999999+0.2724544j)
9 Execution time: 0:02:05.985676 ovlp:
(0.9233792000000001+0.30353279999999994j)
10 Execution time: 0:02:05.993355 ovlp:
(0.9051967999999999+0.33768960000000003j)
11 Execution time: 0:02:06.002053 ovlp: (0.8842816+0.3616256j)
12 Execution time: 0:02:06.010900 ovlp:
(0.8668032000000001+0.3909184000000001j)
13 Execution time: 0:02:06.020519 ovlp:
(0.8425727999999999+0.41829760000000005j)
14 Execution time: 0:02:06.029889 ovlp:
(0.8195840000000001+0.4401919999999999j)

```

15 Execution time: 0:02:06.039722  ovlp:
(0.7963648000000001+0.46183679999999994j)
16 Execution time: 0:02:06.050023  ovlp:
(0.7687999999999999+0.4851008000000001j)
x_points = [np.float64(0.0), np.float64(0.21065846102687621),
np.float64(0.42131692205375243), np.float64(0.6319753830806286),
np.float64(0.8426338441075049), np.float64(1.053292305134381),
np.float64(1.2639507661612572), np.float64(1.4746092271881335),
np.float64(1.6852676882150097), np.float64(1.895926149241886),
np.float64(2.106584610268762), np.float64(2.3172430712956382),
np.float64(2.5279015323225145), np.float64(2.7385599933493907),
np.float64(2.949218454376267), np.float64(3.159876915403143),
np.float64(3.3705353764300194)] y_points = [1.          +0.j
0.9991104      +0.035372799999999998j
0.9958975999999999+0.068819200000000008j
0.9910783999999999+0.103264000000000002j
0.9844096      +0.140825600000000001j
0.975552      +0.176371199999999995j
0.9645695999999999+0.20673919999999999j
0.9524736      +0.245542399999999994j
0.9388479999999999+0.2724544j
0.9233792000000001+0.303532799999999994j
0.9051967999999999+0.337689600000000003j
0.8842816      +0.3616256j
0.8668032000000001+0.390918400000000001j
0.8425727999999999+0.418297600000000005j
0.8195840000000001+0.44019199999999999j
0.7963648000000001+0.461836799999999994j
0.7687999999999999+0.4851008000000001j ]
fit1: [ 0.630694394899259 -0.26350514326411073]
[ 0.630694394899259 -0.26350514326411073 0.36930560510074095
-0.          ] 2.1147927544589203e-09
[ 5.0280984618697200e-01 -2.9089242942960897e-01
2.7379613924095947e-01
-7.7025196479371200e-02 4.2532492844932661e-06]
8.995555503258874e-10
E_gs: -0.29089242942960897
test mps sampling took: (0.0012865066528320312, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.10487260779339502
1 Execution time: 0:02:06.383444  ovlp:
(0.9997407995852794+0.015576024921639897j)
2 Execution time: 0:02:06.385318  ovlp:
(0.9990303984486375+0.03480485568776914j)
3 Execution time: 0:02:06.387778  ovlp:

```

```

(0.9977343963750342+0.05137448219917151j)
4 Execution time: 0:02:06.390854 ovlp:
(0.99610239376383+0.07031051249681997j)
5 Execution time: 0:02:06.394445 ovlp:
(0.9939615903385446+0.08793134069014519j)
6 Execution time: 0:02:06.399325 ovlp:
(0.9908511853618966+0.10516816826906927j)
7 Execution time: 0:02:06.404728 ovlp:
(0.9883983814374102+0.1223425957481532j)
8 Execution time: 0:02:06.410689 ovlp:
(0.9841839746943595+0.13977622364195774j)
9 Execution time: 0:02:06.418052 ovlp:
(0.9799215678745086+0.1545698473117556j)
10 Execution time: 0:02:06.425271 ovlp:
(0.9755631609010575+0.17403387845420548j)
11 Execution time: 0:02:06.432670 ovlp:
(0.9710415536664858+0.1878003004804807j)
12 Execution time: 0:02:06.440534 ovlp:
(0.965271944435111+0.20814273302837294j)
x_points = [np.float64(0.0), np.float64(0.10487260779339502),
np.float64(0.20974521558679005), np.float64(0.31461782338018507),
np.float64(0.4194904311735801), np.float64(0.5243630389669751),
np.float64(0.6292356467603701), np.float64(0.7341082545537652),
np.float64(0.8389808623471602), np.float64(0.9438534701405552),
np.float64(1.0487260779339502), np.float64(1.1535986857273453),
np.float64(1.2584712935207403)] y_points = [1.          +0.j
0.9997407995852794+0.0155760249216399j
0.9990303984486375+0.03480485568776914j
0.9977343963750342+0.05137448219917151j
0.99610239376383 +0.07031051249681997j
0.9939615903385446+0.08793134069014519j
0.9908511853618966+0.10516816826906927j
0.9883983814374102+0.1223425957481532j
0.9841839746943595+0.13977622364195774j
0.9799215678745086+0.1545698473117556j
0.9755631609010575+0.17403387845420548j
0.9710415536664858+0.1878003004804807j
0.965271944435111 +0.20814273302837294j]
fit1: [ 0.6219631317120187 -0.26854513591950413]
[ 0.6219631317120187 -0.26854513591950413 0.37803686828798133
-0.          ] 2.581537358272733e-11
[ 5.1705968146359327e-01 -2.7867174312780496e-01
3.1750724016281739e-01
-7.2736632195761167e-02 1.6788309384799857e-06]
6.800484103502623e-11
E_gs: -0.27867174312780496
test mps sampling took: (0.0013546943664550781, Counter({0: 5, 2: 5}))

```

truncated ham size: 10 Number of fitting points: 16

shots per matrix element: 333333.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.19848466897568026

1 Execution time: 0:02:06.901410 ovlp:

(0.9992379992379992+0.03498903498903494j)

2 Execution time: 0:02:06.903290 ovlp:

(0.9963459963459964+0.0663930663930663j)

3 Execution time: 0:02:06.905771 ovlp:

(0.9922539922539924+0.10011910011910019j)

4 Execution time: 0:02:06.908850 ovlp:

(0.9857379857379858+0.134955134955135j)

5 Execution time: 0:02:06.912579 ovlp:

(0.9784539784539785+0.1662331662331662j)

6 Execution time: 0:02:06.916983 ovlp:

(0.9689259689259688+0.19995319995320004j)

7 Execution time: 0:02:06.923082 ovlp:

(0.9578799578799579+0.22530322530322522j)

8 Execution time: 0:02:06.928686 ovlp:

(0.9444999444999445+0.2599892599892599j)

9 Execution time: 0:02:06.935907 ovlp:

(0.9306159306159305+0.288969288969289j)

10 Execution time: 0:02:06.942857 ovlp:

(0.9148299148299148+0.31970131970131965j)

11 Execution time: 0:02:06.950153 ovlp:

(0.8984498984498985+0.3448593448593449j)

12 Execution time: 0:02:06.958006 ovlp:

(0.879075879075879+0.37094737094737096j)

13 Execution time: 0:02:06.966503 ovlp:

(0.8604278604278603+0.39753339753339745j)

14 Execution time: 0:02:06.975653 ovlp:

(0.8401718401718401+0.42074142074142085j)

15 Execution time: 0:02:06.985366 ovlp:

(0.817047817047817+0.4443034443034444j)

x_points = [np.float64(0.0), np.float64(0.19848466897568026),

np.float64(0.3969693379513605), np.float64(0.5954540069270408),

np.float64(0.793938675902721), np.float64(0.9924233448784013),

np.float64(1.1909080138540815), np.float64(1.3893926828297618),

np.float64(1.587877351805442), np.float64(1.7863620207811224),

np.float64(1.9848466897568027), np.float64(2.1833313587324827),

np.float64(2.381816027708163), np.float64(2.5803006966838433),

np.float64(2.7787853656595236), np.float64(2.977270034635204)] y_points

= [1. +0.j

0.9992379992379992+0.03498903498903494j

0.9963459963459964+0.0663930663930663j

0.9922539922539924+0.10011910011910019j

0.9857379857379858+0.134955134955135j

0.9784539784539785+0.1662331662331662j
 0.9689259689259688+0.19995319995320004j
 0.9578799578799579+0.22530322530322522j
 0.9444999444999445+0.2599892599892599j
 0.9306159306159305+0.288969288969289j
 0.9148299148299148+0.31970131970131965j
 0.8984498984498985+0.3448593448593449j
 0.879075879075879 +0.37094737094737096j
 0.8604278604278603+0.39753339753339745j
 0.8401718401718401+0.42074142074142085j
 0.817047817047817 +0.4443034443034444j]
 fit1: [0.6353551392885558 -0.2626682741041676]
 [0.6353551392885558 -0.2626682741041676 0.3646448607114442
 -0.] 5.798015885082381e-10
 [5.1871738111130805e-01 -2.8650307639938816e-01
 2.5650073538279616e-01
 -7.4430478865275360e-02 1.8524941876890126e-06]
 2.6864775254229045e-10
 E_gs: -0.28650307639938816
 test mps sampling took: (0.0012867450714111328, Counter({2: 6, 0: 4}))
 truncated ham size: 10 Number of fitting points: 16
 shots per matrix element: 333333.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.2553438358081997
 1 Execution time: 0:02:07.384934 ovlp:
 (0.9984639984639985+0.04434304434304437j)
 2 Execution time: 0:02:07.386829 ovlp:
 (0.9940299940299939+0.0838590838590838j)
 3 Execution time: 0:02:07.389294 ovlp:
 (0.9869079869079869+0.12935112935112936j)
 4 Execution time: 0:02:07.392823 ovlp:
 (0.9768639768639769+0.1722751722751723j)
 5 Execution time: 0:02:07.396728 ovlp:
 (0.9650139650139651+0.21095121095121105j)
 6 Execution time: 0:02:07.401182 ovlp:
 (0.9492939492939494+0.25079125079125086j)
 7 Execution time: 0:02:07.406118 ovlp:
 (0.9311019311019311+0.2893712893712894j)
 8 Execution time: 0:02:07.411598 ovlp:
 (0.9113739113739114+0.3253173253173254j)
 9 Execution time: 0:02:07.417696 ovlp:
 (0.8877578877578878+0.3597933597933598j)
 10 Execution time: 0:02:07.424228 ovlp:
 (0.8614658614658615+0.3931773931773932j)
 11 Execution time: 0:02:07.431527 ovlp:
 (0.8359238359238359+0.4268914268914268j)
 12 Execution time: 0:02:07.439292 ovlp:


```

(0.807099807099807+0.4521814521814522j)
13 Execution time: 0:02:07.447744  ovlp:
(0.7776757776757777+0.47919947919947914j)
14 Execution time: 0:02:07.456737  ovlp:
(0.7469977469977469+0.5043755043755043j)
15 Execution time: 0:02:07.468162  ovlp:
(0.713031713031713+0.5267855267855268j)
x_points = [np.float64(0.0), np.float64(0.2553438358081997),
np.float64(0.5106876716163994), np.float64(0.7660315074245991),
np.float64(1.0213753432327988), np.float64(1.2767191790409984),
np.float64(1.5320630148491983), np.float64(1.787406850657398),
np.float64(2.0427506864655975), np.float64(2.2980945222737974),
np.float64(2.553438358081997), np.float64(2.8087821938901967),
np.float64(3.0641260296983965), np.float64(3.319469865506596),
np.float64(3.574813701314796), np.float64(3.8301575371229952)] y_points =
[1.          +0.j
 0.9984639984639985+0.04434304434304437j
 0.9940299940299939+0.0838590838590838j
 0.9869079869079869+0.12935112935112936j
 0.9768639768639769+0.1722751722751723j
 0.9650139650139651+0.21095121095121105j
 0.9492939492939494+0.25079125079125086j
 0.9311019311019311+0.2893712893712894j
 0.9113739113739114+0.3253173253173254j
 0.8877578877578878+0.3597933597933598j
 0.8614658614658615+0.3931773931773932j
 0.8359238359238359+0.4268914268914268j
 0.807099807099807 +0.4521814521814522j
 0.7776757776757777+0.47919947919947914j
 0.7469977469977469+0.5043755043755043j
 0.713031713031713 +0.5267855267855268j ]
fit1: [ 0.6316947620655236 -0.26125818612824725]
[ 0.5814512595622797 -0.2724318899851421  0.3693707248523271
 -0.02008635190138058] 1.3804983319725046e-09
[ 0.5183029253927892 -0.287263260287522  0.32817100376926944
 -0.05046283928889918 -0.00772583579090352] 5.672721361086903e-10
E_gs: -0.287263260287522
test mps sampling took: (0.001295328140258789, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.04166183250640968
1 Execution time: 0:02:07.824961  ovlp:
(0.9999543998449594+0.006243421227632107j)
2 Execution time: 0:02:07.827081  ovlp:
(0.9997947993023177+0.01350904593075608j)
3 Execution time: 0:02:07.829639  ovlp:

```

```

(0.9996427987855159+0.020721470452999435j)
4 Execution time: 0:02:07.832933  ovlp:
(0.9993615978294326+0.02946150016910054j)
5 Execution time: 0:02:07.836776  ovlp:
(0.9990803968733493+0.03857393115136598j)
6 Execution time: 0:02:07.841064  ovlp:
(0.9985483950645433+0.04177354203004291j)
7 Execution time: 0:02:07.846019  ovlp:
(0.9981151935916581+0.04838556451091924j)
8 Execution time: 0:02:07.851414  ovlp:
(0.9976287919378926+0.059139601074643666j)
9 Execution time: 0:02:07.857423  ovlp:
(0.9968763893797239+0.061830010222034826j)
10 Execution time: 0:02:07.863940  ovlp:
(0.996101186744035+0.07027363893037242j)
11 Execution time: 0:02:07.871166  ovlp:
(0.9950523831781029+0.07944687011935847j)
12 Execution time: 0:02:07.879074  ovlp:
(0.9944443811108958+0.0823348799385919j)
13 Execution time: 0:02:07.887663  ovlp:
(0.993767978811128+0.09133331053325588j)
14 Execution time: 0:02:07.896630  ovlp:
(0.99221757353975+0.09898653655422418j)
15 Execution time: 0:02:07.908036  ovlp:
(0.9914651709815814+0.10481575637357166j)
16 Execution time: 0:02:07.918826  ovlp:
(0.989960365865244+0.10949737229106571j)
17 Execution time: 0:02:07.931551  ovlp:
(0.9883643604388255+0.11876180379013279j)
18 Execution time: 0:02:07.943333  ovlp:
(0.9878931588367401+0.12653663022454276j)
19 Execution time: 0:02:07.955749  ovlp:
(0.9860083524283982+0.1323202498888496j)
x_points = [np.float64(0.0), np.float64(0.04166183250640968),
np.float64(0.08332366501281936), np.float64(0.12498549751922905),
np.float64(0.16664733002563872), np.float64(0.2083091625320484),
np.float64(0.2499709950384581), np.float64(0.29163282754486775),
np.float64(0.33329466005127745), np.float64(0.37495649255768715),
np.float64(0.4166183250640968), np.float64(0.4582801575705065),
np.float64(0.4999419900769162), np.float64(0.5416038225833258),
np.float64(0.5832656550897355), np.float64(0.6249274875961452),
np.float64(0.6665893201025549), np.float64(0.7082511526089645),
np.float64(0.7499129851153743), np.float64(0.7915748176217839)] y_points
= [1.          +0.j
0.9999543998449594+0.00624342122763211j
0.9997947993023177+0.01350904593075608j
0.9996427987855159+0.02072147045299944j

```

0.9993615978294326+0.02946150016910054j
 0.9990803968733493+0.03857393115136598j
 0.9985483950645433+0.04177354203004291j
 0.9981151935916581+0.04838556451091924j
 0.9976287919378926+0.05913960107464367j
 0.9968763893797239+0.06183001022203483j
 0.996101186744035 +0.07027363893037242j
 0.9950523831781029+0.07944687011935847j
 0.9944443811108958+0.0823348799385919j
 0.993767978811128 +0.09133331053325588j
 0.99221757353975 +0.09898653655422418j
 0.9914651709815814+0.10481575637357166j
 0.989960365865244 +0.10949737229106571j
 0.9883643604388255+0.11876180379013279j
 0.9878931588367401+0.12653663022454276j
 0.9860083524283982+0.1323202498888496j]
 fit1: [0.5939325799569853 -0.28512822174872465]
 [0.5939325799569853 -0.28512822174872465 0.40606742004301466
 -0.] 1.5003334412263386e-10
 [5.0770665649477731e-01 -2.7934867926323881e-01
 3.4380826791054508e-01
 -7.9613368219883282e-02 2.7359009516142714e-06]
 1.539202646469296e-10
 E_gs: -0.2793486792632388
 test mps sampling took: (0.0012958049774169922, Counter({2: 7, 0: 3}))
 truncated ham size: 10 Number of fitting points: 18
 shots per matrix element: 294117.0
 Total gate count: 172 2 qubit gates: 80
 N gate: 172 dt: 0.14436322213132546
 1 Execution time: 0:02:08.525191 ovlp:
 (0.9995307989677578+0.024252253354957398j)
 2 Execution time: 0:02:08.527116 ovlp:
 (0.9981435959159111+0.04583550083810195j)
 3 Execution time: 0:02:08.529569 ovlp:
 (0.9959947911885405+0.07657156845745061j)
 4 Execution time: 0:02:08.532598 ovlp:
 (0.9929143844116457+0.09670641275410796j)
 5 Execution time: 0:02:08.536217 ovlp:
 (0.988446774582904+0.12470887435952349j)
 6 Execution time: 0:02:08.540356 ovlp:
 (0.9834963636920002+0.14096771012896236j)
 7 Execution time: 0:02:08.545083 ovlp:
 (0.9773627501980504+0.16757616866757097j)
 8 Execution time: 0:02:08.550566 ovlp:
 (0.9703043346695364+0.19269542392993255j)
 9 Execution time: 0:02:08.556595 ovlp:
 (0.962613517749739+0.21547547404604295j)

```

10 Execution time: 0:02:08.563088  ovlp:
(0.9541814991992983+0.23512751728053805j)
11 Execution time: 0:02:08.570277  ovlp:
(0.9455114801252562+0.25784636726200794j)
12 Execution time: 0:02:08.578250  ovlp:
(0.9357534586576091+0.2812588187694014j)
13 Execution time: 0:02:08.586667  ovlp:
(0.9244382337641144+0.304344869558713j)
14 Execution time: 0:02:08.595666  ovlp:
(0.9112190046818103+0.32133810694383524j)
15 Execution time: 0:02:08.605163  ovlp:
(0.8986797770955095+0.34173135180897396j)
16 Execution time: 0:02:08.615434  ovlp:
(0.8879561535035376+0.363838200444041j)
17 Execution time: 0:02:08.626392  ovlp:
(0.8720713185569009+0.38428584542886j)
x_points = [np.float64(0.0), np.float64(0.14436322213132546),
np.float64(0.2887264442626509), np.float64(0.4330896663939764),
np.float64(0.5774528885253019), np.float64(0.7218161106566273),
np.float64(0.8661793327879528), np.float64(1.0105425549192781),
np.float64(1.1549057770506037), np.float64(1.2992689991819293),
np.float64(1.4436322213132546), np.float64(1.58799544344458),
np.float64(1.7323586655759056), np.float64(1.8767218877072311),
np.float64(2.0210851098385563), np.float64(2.165448331969882),
np.float64(2.3098115541012074), np.float64(2.454174776232533)] y_points =
[1.          +0.j
0.9995307989677578+0.0242522533549574j
0.9981435959159111+0.04583550083810195j
0.9959947911885405+0.07657156845745061j
0.9929143844116457+0.09670641275410796j
0.988446774582904 +0.12470887435952349j
0.9834963636920002+0.14096771012896236j
0.9773627501980504+0.16757616866757097j
0.9703043346695364+0.19269542392993255j
0.962613517749739 +0.21547547404604295j
0.9541814991992983+0.23512751728053805j
0.9455114801252562+0.25784636726200794j
0.9357534586576091+0.2812588187694014j
0.9244382337641144+0.304344869558713j
0.9112190046818103+0.32133810694383524j
0.8986797770955095+0.34173135180897396j
0.8879561535035376+0.363838200444041j
0.8720713185569009+0.38428584542886j ]
fit1: [ 0.6379094958994806 -0.26329471902210994]
[ 0.6379094958994806 -0.26329471902210994  0.36209050410051935
-0.          ] 4.3909798772942257e-10
[ 4.9626684259715520e-01 -2.9274449208985037e-01

```

```

3.2534013478545154e-01
-7.1138152758107281e-02 4.6600551061004141e-06]
3.8411714842405925e-10
E_gs: -0.29274449208985037
test mps sampling took: (0.0012707710266113281, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 16
shots per matrix element: 333333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.14074691309904627
1 Execution time: 0:02:08.964351 ovlp:
(0.9995439995439996+0.02271302271302278j)
2 Execution time: 0:02:08.966270 ovlp:
(0.9982119982119981+0.048879048879048925j)
3 Execution time: 0:02:08.968749 ovlp:
(0.9961659961659961+0.07116907116907112j)
4 Execution time: 0:02:08.971850 ovlp:
(0.9928119928119927+0.09392709392709397j)
5 Execution time: 0:02:08.976060 ovlp:
(0.989067989067989+0.11579711579711582j)
6 Execution time: 0:02:08.980761 ovlp:
(0.984003984003984+0.14181314181314186j)
7 Execution time: 0:02:08.985760 ovlp:
(0.9787119787119787+0.1655071655071656j)
8 Execution time: 0:02:08.991190 ovlp:
(0.9716619716619717+0.18750918750918744j)
9 Execution time: 0:02:08.998962 ovlp:
(0.9643779643779644+0.2074532074532074j)
10 Execution time: 0:02:09.006180 ovlp:
(0.9565299565299565+0.22701322701322701j)
11 Execution time: 0:02:09.014581 ovlp:
(0.9472539472539472+0.25330525330525333j)
12 Execution time: 0:02:09.023259 ovlp:
(0.9368379368379369+0.27416727416727427j)
13 Execution time: 0:02:09.032137 ovlp:
(0.9282939282939282+0.29409929409929414j)
14 Execution time: 0:02:09.042583 ovlp:
(0.9169059169059168+0.31374331374331366j)
15 Execution time: 0:02:09.052983 ovlp:
(0.9034359034359034+0.3357093357093357j)
x_points = [np.float64(0.0), np.float64(0.14074691309904627),
np.float64(0.28149382619809254), np.float64(0.4222407392971388),
np.float64(0.5629876523961851), np.float64(0.7037345654952314),
np.float64(0.8444814785942776), np.float64(0.9852283916933239),
np.float64(1.1259753047923702), np.float64(1.2667222178914164),
np.float64(1.4074691309904628), np.float64(1.548216044089509),
np.float64(1.6889629571885552), np.float64(1.8297098702876016),
np.float64(1.9704567833866478), np.float64(2.111203696485694)] y_points

```

```

= [1.          +0.j
0.9995439995439996+0.02271302271302278j
0.9982119982119981+0.04887904887904893j
0.9961659961659961+0.07116907116907112j
0.9928119928119927+0.09392709392709397j
0.989067989067989 +0.11579711579711582j
0.984003984003984 +0.14181314181314186j
0.9787119787119787+0.1655071655071656j
0.9716619716619717+0.18750918750918744j
0.9643779643779644+0.2074532074532074j
0.9565299565299565+0.22701322701322701j
0.9472539472539472+0.25330525330525333j
0.9368379368379369+0.27416727416727427j
0.9282939282939282+0.29409929409929414j
0.9169059169059168+0.31374331374331366j
0.9034359034359034+0.3357093357093357j ]
fit1: [ 0.6241754541478925 -0.2679102715843274]
[ 0.6241754541478925 -0.2679102715843274  0.37582454585210745
-0.          ] 1.0134181320386663e-10
[ 5.1574337669147519e-01 -2.9043982700156690e-01
3.0817824757121448e-01
-5.7884472878564068e-02  1.7018078113877126e-06]
8.46454608105442e-11
E_gs: -0.2904398270015669
test mps sampling took: (0.0012786388397216797, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.08988950643506721
1 Execution time: 0:02:09.402045 ovlp:
(0.9998099993539977+0.01245264233898391j)
2 Execution time: 0:02:09.403967 ovlp:
(0.9992779975451918+0.03013030244302839j)
3 Execution time: 0:02:09.406465 ovlp:
(0.9982899941859802+0.048172763787396766j)
4 Execution time: 0:02:09.409897 ovlp:
(0.9971347902582868+0.05905600079040263j)
5 Execution time: 0:02:09.413658 ovlp:
(0.9950827832814633+0.07466645386594317j)
6 Execution time: 0:02:09.418369 ovlp:
(0.9939199793279296+0.08988170559779896j)
7 Execution time: 0:02:09.423472 ovlp:
(0.9912371702063787+0.10280174952594834j)
8 Execution time: 0:02:09.429665 ovlp:
(0.9882655601029045+0.12104941156799942j)
9 Execution time: 0:02:09.436188 ovlp:
(0.985810751756556+0.1303594432221069j)

```

```
10 Execution time: 0:02:09.442800  ovlp:
(0.9828011415238811+0.1506439121893015j)
11 Execution time: 0:02:09.450045  ovlp:
(0.9790391287330378+0.1633435553680882j)
12 Execution time: 0:02:09.457990  ovlp:
(0.9745931136165864+0.18042841345660565j)
13 Execution time: 0:02:09.466652  ovlp:
(0.9702382988102161+0.19476206219101155j)
14 Execution time: 0:02:09.475766  ovlp:
(0.9652070817040779+0.20893611038277538j)
15 Execution time: 0:02:09.485441  ovlp:
(0.9597198630475343+0.22502536508624127j)
16 Execution time: 0:02:09.495782  ovlp:
(0.9550458471558803+0.23634180356213208j)
17 Execution time: 0:02:09.508816  ovlp:
(0.949133027052292+0.2508350528391796j)
18 Execution time: 0:02:09.520594  ovlp:
(0.9437370087058297+0.26364869640556776j)
19 Execution time: 0:02:09.532804  ovlp:
(0.9378469886797616+0.2766903407471586j)
x_points = [np.float64(0.0), np.float64(0.08988950643506721),
np.float64(0.17977901287013442), np.float64(0.26966851930520164),
np.float64(0.35955802574026885), np.float64(0.44944753217533606),
np.float64(0.5393370386104033), np.float64(0.6292265450454705),
np.float64(0.7191160514805377), np.float64(0.8090055579156049),
np.float64(0.8988950643506721), np.float64(0.9887845707857393),
np.float64(1.0786740772208065), np.float64(1.1685635836558737),
np.float64(1.258453090090941), np.float64(1.3483425965260083),
np.float64(1.4382321029610754), np.float64(1.5281216093961425),
np.float64(1.6180111158312098), np.float64(1.7079006222662771)] y_points =
[1.          +0.j
0.9998099993539977+0.01245264233898391j
0.9992779975451918+0.03013030244302839j
0.9982899941859802+0.04817276378739677j
0.9971347902582868+0.05905600079040263j
0.9950827832814633+0.07466645386594317j
0.9939199793279296+0.08988170559779896j
0.9912371702063787+0.10280174952594834j
0.9882655601029045+0.12104941156799942j
0.985810751756556 +0.1303594432221069j
0.9828011415238811+0.1506439121893015j
0.9790391287330378+0.1633435553680882j
0.9745931136165864+0.18042841345660565j
0.9702382988102161+0.19476206219101155j
0.9652070817040779+0.20893611038277538j
0.9597198630475343+0.22502536508624127j
0.9550458471558803+0.23634180356213208j
```

0.949133027052292 +0.2508350528391796j
0.9437370087058297+0.26364869640556776j
0.9378469886797616+0.2766903407471586j]
fit1: [0.635686341619485 -0.26405741312506337]
[0.635686341619485 -0.26405741312506337 0.364313658380515
-0.] 3.600918070567014e-10
[5.1694755281774307e-01 -2.8656925128284511e-01
2.6933789708280337e-01
-7.4018048370850867e-02 3.7915831948323933e-06]
3.777157403985452e-10
E_gs: -0.2865692512828451
test mps sampling took: (0.0012853145599365234, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 24
shots per matrix element: 217391.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.11263797073449973
1 Execution time: 0:02:10.016343 ovlp:
(0.9998343997681596+0.017236224130713795j)
2 Execution time: 0:02:10.018401 ovlp:
(0.9987395982354375+0.03819385347139481j)
3 Execution time: 0:02:10.020953 ovlp:
(0.9973319962647949+0.054146675805346156j)
4 Execution time: 0:02:10.024004 ovlp:
(0.9957587940623116+0.07204070085698122j)
5 Execution time: 0:02:10.028398 ovlp:
(0.992925190095266+0.09309033032646252j)
6 Execution time: 0:02:10.033218 ovlp:
(0.9899627859479003+0.11105795548113773j)
7 Execution time: 0:02:10.038278 ovlp:
(0.9864299810019734+0.13161078425509798j)
8 Execution time: 0:02:10.043618 ovlp:
(0.9815355741498037+0.15230161322225855j)
9 Execution time: 0:02:10.049594 ovlp:
(0.977064367890115+0.16639603295444605j)
10 Execution time: 0:02:10.056051 ovlp:
(0.9710659594923432+0.18883486436881003j)
11 Execution time: 0:02:10.063305 ovlp:
(0.9671099539539356+0.2036192850669991j)
12 Execution time: 0:02:10.071262 ovlp:
(0.9597683436756812+0.22209291093007533j)
13 Execution time: 0:02:10.079592 ovlp:
(0.9531535344149482+0.23832173365042708j)
14 Execution time: 0:02:10.088757 ovlp:
(0.9462075246905346+0.25759576063406486j)
15 Execution time: 0:02:10.098444 ovlp:
(0.9381299133818788+0.2741649838309774j)
16 Execution time: 0:02:10.110522 ovlp:


```

(0.9294359012102618+0.29139660795525124j)
17 Execution time: 0:02:10.121840  ovlp:
(0.920953489334885+0.3049114268759976j)
18 Execution time: 0:02:10.133302  ovlp:
(0.9099686739561434+0.3227686518761126j)
19 Execution time: 0:02:10.145274  ovlp:
(0.9022774631884485+0.3422542791559908j)
20 Execution time: 0:02:10.158066  ovlp:
(0.8906210468694655+0.35529989741985646j)
21 Execution time: 0:02:10.171303  ovlp:
(0.881163433628807+0.3716115202561283j)
22 Execution time: 0:02:10.185155  ovlp:
(0.8702246183144657+0.38513553918975485j)
23 Execution time: 0:02:10.199888  ovlp:
(0.8605370047518066+0.3985123579173011j)
x_points = [np.float64(0.0), np.float64(0.11263797073449973),
np.float64(0.22527594146899946), np.float64(0.3379139122034992),
np.float64(0.4505518829379989), np.float64(0.5631898536724986),
np.float64(0.6758278244069984), np.float64(0.7884657951414981),
np.float64(0.9011037658759978), np.float64(1.0137417366104975),
np.float64(1.1263797073449973), np.float64(1.239017678079497),
np.float64(1.3516556488139968), np.float64(1.4642936195484966),
np.float64(1.5769315902829961), np.float64(1.689569561017496),
np.float64(1.8022075317519957), np.float64(1.9148455024864954),
np.float64(2.027483473220995), np.float64(2.1401214439554948),
np.float64(2.2527594146899945), np.float64(2.3653973854244943),
np.float64(2.478035356158994), np.float64(2.590673326893494)] y_points
= [1.          +0.j
0.9998343997681596+0.0172362241307138j
0.9987395982354375+0.03819385347139481j
0.9973319962647949+0.05414667580534616j
0.9957587940623116+0.07204070085698122j
0.992925190095266 +0.09309033032646252j
0.9899627859479003+0.11105795548113773j
0.9864299810019734+0.13161078425509798j
0.9815355741498037+0.15230161322225855j
0.977064367890115 +0.16639603295444605j
0.9710659594923432+0.18883486436881003j
0.9671099539539356+0.2036192850669991j
0.9597683436756812+0.22209291093007533j
0.9531535344149482+0.23832173365042708j
0.9462075246905346+0.25759576063406486j
0.9381299133818788+0.2741649838309774j
0.9294359012102618+0.29139660795525124j
0.920953489334885 +0.3049114268759976j
0.9099686739561434+0.3227686518761126j
0.9022774631884485+0.3422542791559908j

```

0.8906210468694655+0.35529989741985646j
0.881163433628807 +0.3716115202561283j
0.8702246183144657+0.38513553918975485j
0.8605370047518066+0.3985123579173011j]
fit1: [0.6391532480919122 -0.26178349095288744]
[0.6391532480919122 -0.26178349095288744 0.3608467519080878
-0.] 2.843775370304607e-10
[5.2477479303302665e-01 -2.8581322223755001e-01
2.8447073860237987e-01
-6.3028416929086492e-02 1.5562459414203574e-06]
2.395620487720302e-10
E_gs: -0.28581322223755
test mps sampling took: (0.0013289451599121094, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 19
shots per matrix element: 277777.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.28228097198567725
1 Execution time: 0:02:10.567234 ovlp:
(0.9981855949196659+0.04700533161492859j)
2 Execution time: 0:02:10.569243 ovlp:
(0.9927855797996235+0.09690867134427972j)
3 Execution time: 0:02:10.571759 ovlp:
(0.9843831562728376+0.13974879129661555j)
4 Execution time: 0:02:10.575252 ovlp:
(0.9719127213556198+0.1858865204822573j)
5 Execution time: 0:02:10.579079 ovlp:
(0.9564398780316585+0.23450825662311847j)
6 Execution time: 0:02:10.584198 ovlp:
(0.9369638234987059+0.27837797945834253j)
7 Execution time: 0:02:10.589549 ovlp:
(0.9145213606598099+0.3154724833229534j)
8 Execution time: 0:02:10.595165 ovlp:
(0.8913084956637878+0.35281178787300616j)
9 Execution time: 0:02:10.601154 ovlp:
(0.8630556165557264+0.3911806953059469j)
10 Execution time: 0:02:10.607717 ovlp:
(0.8358107402700727+0.4258415923564587j)
11 Execution time: 0:02:10.615789 ovlp:
(0.8012506435018019+0.46120089136249587j)
12 Execution time: 0:02:10.625124 ovlp:
(0.7663665458263282+0.48809296666030666j)
13 Execution time: 0:02:10.633829 ovlp:
(0.7327424516788648+0.5151218423411585j)
14 Execution time: 0:02:10.642852 ovlp:
(0.694762345334567+0.5378235059058165j)
15 Execution time: 0:02:10.652540 ovlp:
(0.6570630397765114+0.5577747617693329j)

```

16 Execution time: 0:02:10.662660  ovlp:
(0.6182405310734871+0.5716564006379219j)
17 Execution time: 0:02:10.675478  ovlp:
(0.5801668244671085+0.58673324285308j)
18 Execution time: 0:02:10.687253  ovlp:
(0.5421939181429709+0.5963164696861152j)
x_points = [np.float64(0.0), np.float64(0.28228097198567725),
np.float64(0.5645619439713545), np.float64(0.8468429159570318),
np.float64(1.129123887942709), np.float64(1.4114048599283864),
np.float64(1.6936858319140635), np.float64(1.9759668038997407),
np.float64(2.258247775885418), np.float64(2.5405287478710954),
np.float64(2.8228097198567728), np.float64(3.1050906918424497),
np.float64(3.387371663828127), np.float64(3.6696526358138044),
np.float64(3.9519336077994813), np.float64(4.234214579785159),
np.float64(4.516495551770836), np.float64(4.798776523756513),
np.float64(5.081057495742191)] y_points = [1.          +0.j
0.9981855949196659+0.04700533161492859j
0.9927855797996235+0.09690867134427972j
0.9843831562728376+0.13974879129661555j
0.9719127213556198+0.1858865204822573j
0.9564398780316585+0.23450825662311847j
0.9369638234987059+0.27837797945834253j
0.9145213606598099+0.3154724833229534j
0.8913084956637878+0.35281178787300616j
0.8630556165557264+0.3911806953059469j
0.8358107402700727+0.4258415923564587j
0.8012506435018019+0.46120089136249587j
0.7663665458263282+0.48809296666030666j
0.7327424516788648+0.5151218423411585j
0.694762345334567 +0.5378235059058165j
0.6570630397765114+0.5577747617693329j
0.6182405310734871+0.5716564006379219j
0.5801668244671085+0.58673324285308j
0.5421939181429709+0.5963164696861152j ]
fit1: [ 0.6249015711426305 -0.25992659370058874]
[ 0.43778356640432975 -0.3059892187877896  0.40928456913275635
-0.07991060070340379] 3.430848576056845e-09
[ 0.41988190663126135 -0.31486046050631794  0.33221967897423105
-0.07682205705396558 -0.04109335360285051] 8.30678863589703e-10
E_gs: -0.31486046050631794
test mps sampling took: (0.0012784004211425781, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.0608355712051775
1 Execution time: 0:02:11.216982  ovlp:
(0.9999248000000001+0.009967999999999977j)

```

```

2 Execution time: 0:02:11.218912  ovlp:
(0.9996640000000001+0.021291200000000066j)
3 Execution time: 0:02:11.221450  ovlp:
(0.9992319999999999+0.032667199999999896j)
4 Execution time: 0:02:11.225036  ovlp:
(0.9987311999999999+0.03999839999999999j)
x_points = [np.float64(0.0), np.float64(0.0608355712051775),
np.float64(0.121671142410355), np.float64(0.1825067136155325),
np.float64(0.24334228482071)] y_points = [1.          +0.j
0.9999248000000001+0.00996799999999998j
0.9996640000000001+0.02129120000000007j
0.9992319999999999+0.03266719999999999j
0.9987311999999999+0.03999839999999999j]
fit1: [ 0.34120435701056634 -0.5119086079201709 ]
[ 0.34120435701056634 -0.5119086079201709  0.34121435691056634
-0.          ] 2.993683605850885e-11
[ 2.9418006076665104e-01 -4.4138274557233231e-01
2.9418931606126791e-01
-1.7447810952005238e-01  1.3776945999142869e-06]
1.398645861502884e-10
E_gs: -0.4413827455723323
test mps sampling took: (0.00135040283203125, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 13
shots per matrix element: 416666.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.20876463081083535
1 Execution time: 0:02:11.908293  ovlp:
(0.9990735985177577+0.03465605544968864j)
2 Execution time: 0:02:11.910243  ovlp:
(0.9960495936793499+0.06824650919441466j)
3 Execution time: 0:02:11.912765  ovlp:
(0.9913215861145377+0.10199056318490118j)
4 Execution time: 0:02:11.915861  ovlp:
(0.9843807750092399+0.13784662055459296j)
5 Execution time: 0:02:11.919454  ovlp:
(0.9754671607474572+0.17162427459883944j)
6 Execution time: 0:02:11.923553  ovlp:
(0.9656703450725521+0.2063859302174884j)
7 Execution time: 0:02:11.928218  ovlp:
(0.9532815252504403+0.239448383117413j)
8 Execution time: 0:02:11.934289  ovlp:
(0.9391791026865643+0.27119563391301416j)
9 Execution time: 0:02:11.941336  ovlp:
(0.9231854770967634+0.30431568690509914j)
10 Execution time: 0:02:11.948537  ovlp:
(0.9055742489187983+0.3298661277858044j)
11 Execution time: 0:02:11.955889  ovlp:

```

```

(0.8871278194045111+0.36061017697628306j)
12 Execution time: 0:02:11.964261 ovlp:
(0.8675677881084609+0.38749981999971195j)
x_points = [np.float64(0.0), np.float64(0.20876463081083535),
np.float64(0.4175292616216707), np.float64(0.6262938924325061),
np.float64(0.8350585232433414), np.float64(1.0438231540541767),
np.float64(1.2525877848650122), np.float64(1.4613524156758475),
np.float64(1.6701170464866828), np.float64(1.878881677297518),
np.float64(2.0876463081083534), np.float64(2.296410938919189),
np.float64(2.5051755697300244)] y_points = [1.          +0.j
0.9990735985177577+0.03465605544968864j
0.9960495936793499+0.06824650919441466j
0.9913215861145377+0.10199056318490118j
0.9843807750092399+0.13784662055459296j
0.9754671607474572+0.17162427459883944j
0.9656703450725521+0.2063859302174884j
0.9532815252504403+0.239448383117413j
0.9391791026865643+0.27119563391301416j
0.9231854770967634+0.30431568690509914j
0.9055742489187983+0.3298661277858044j
0.8871278194045111+0.36061017697628306j
0.8675677881084609+0.38749981999971195j]
fit1: [ 0.6342604296078763 -0.26376774097405403]
[ 0.6342604296078763 -0.26376774097405403  0.3657395703921237
-0.          ] 6.553832557087703e-11
[ 5.1186624563626637e-01 -2.8913140212992572e-01
2.9986370121644546e-01
-6.6511203375913236e-02  1.5389145004069219e-06]
7.263327224874425e-11
E_gs: -0.2891314021299257
test mps sampling took: (0.0012700557708740234, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2023829580436768
1 Execution time: 0:02:12.333743 ovlp:
(0.9991540000000001+0.0339959999999999915j)
2 Execution time: 0:02:12.335648 ovlp:
(0.9964139999999999+0.067922000000000004j)
3 Execution time: 0:02:12.338098 ovlp: (0.991814+0.10202j)
4 Execution time: 0:02:12.341121 ovlp:
(0.9853559999999999+0.13385599999999998j)
5 Execution time: 0:02:12.344717 ovlp: (0.977314+0.166093999999999996j)
x_points = [np.float64(0.0), np.float64(0.2023829580436768),
np.float64(0.4047659160873536), np.float64(0.6071488741310305),
np.float64(0.8095318321747073), np.float64(1.011914790218384)] y_points =
[1.          +0.j

```

0.9991540000000001+0.03399599999999992j
0.9964139999999999+0.06792200000000004j
0.991814 +0.10202j
0.9853559999999999+0.13385599999999998j
0.977314 +0.16609399999999996j]
fit1: [0.5786503066597393 -0.2885207685861472]
[0.5786503066597393 -0.2885207685861472 0.42134969334026073
-0.] 8.35811982606729e-12
[4.9909280712473064e-01 -2.7013382585352003e-01
3.6712338824206409e-01
-8.9639597955261066e-02 2.1663205146682480e-06]
6.606926829279821e-11
E_gs: -0.27013382585352
test mps sampling took: (0.0012559890747070312, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 17
shots per matrix element: 312500.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.004268408250411143
1 Execution time: 0:02:12.978646 ovlp: (1-0.0008127999999999469j)
2 Execution time: 0:02:12.980534 ovlp: (1+0.0042431999999998915j)
3 Execution time: 0:02:12.983012 ovlp:
(0.9999936+0.0060416000000000091j)
4 Execution time: 0:02:12.986592 ovlp:
(0.9999936+0.00488320000000000875j)
5 Execution time: 0:02:12.990497 ovlp:
(0.9999743999999999+0.0071680000000000063j)
6 Execution time: 0:02:12.995350 ovlp: (1+0.0034815999999999736j)
7 Execution time: 0:02:13.000649 ovlp:
(0.9999616+0.0021439999999999237j)
8 Execution time: 0:02:13.007220 ovlp:
(0.9999743999999999+0.0037376000000000076j)
9 Execution time: 0:02:13.013811 ovlp:
(0.9999743999999999+0.004947199999999929j)
10 Execution time: 0:02:13.021087 ovlp:
(0.9999488000000001+0.008064000000000071j)
11 Execution time: 0:02:13.030067 ovlp:
(0.9999488000000001+0.0055616000000000055j)
12 Execution time: 0:02:13.039043 ovlp:
(0.9999488000000001+0.008569599999999955j)
13 Execution time: 0:02:13.048738 ovlp:
(0.9999168+0.007033599999999973j)
14 Execution time: 0:02:13.058417 ovlp:
(0.9999488000000001+0.013132799999999945j)
15 Execution time: 0:02:13.069528 ovlp:
(0.9998848+0.0101503999999999893j)
16 Execution time: 0:02:13.080683 ovlp:
(0.9999488000000001+0.009792000000000023j)

```

x_points = [np.float64(0.0), np.float64(0.004268408250411143),
np.float64(0.008536816500822286), np.float64(0.012805224751233428),
np.float64(0.01707363300164457), np.float64(0.021342041252055716),
np.float64(0.025610449502466857), np.float64(0.029878857752877998),
np.float64(0.03414726600328914), np.float64(0.03841567425370029),
np.float64(0.04268408250411143), np.float64(0.04695249075452257),
np.float64(0.05122089900493371), np.float64(0.05548930725534486),
np.float64(0.059757715505755996), np.float64(0.06402612375616715),
np.float64(0.06829453200657828)] y_points = [1.          +0.j
1.          -0.00081279999999995j
1.          +0.004243199999999989j
0.9999936    +0.006041600000000009j
0.9999936    +0.004883200000000009j
0.9999743999999999+0.007168000000000006j
1.          +0.003481599999999997j
0.9999616    +0.002143999999999992j
0.9999743999999999+0.003737600000000001j
0.9999743999999999+0.004947199999999993j
0.99994880000000001+0.008064000000000007j
0.99994880000000001+0.005561600000000006j
0.99994880000000001+0.008569599999999996j
0.9999168    +0.007033599999999997j
0.99994880000000001+0.013132799999999994j
0.9998848    +0.010150399999999989j
0.99994880000000001+0.009792000000000002j]
fit1: [ 0.09119553511647155 -1.9662203248598815 ]
[ 0.09119553511647155 -1.9662203248598815  0.09120553501647155
 -0.          ] 3.875669990612994e-10
[ 8.318522969955092e-02 -1.793965663798104e+00
 8.318274267386276e-02
 -7.794488730982498e-01  8.811605721544722e-07]
1.270349322189194e-09
E_gs: -1.793965663798104
test mps sampling took: (0.001268625259399414, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.21300878448788152
1 Execution time: 0:02:13.264476 ovlp:
(0.999031599031599+0.036354636354636316j)
2 Execution time: 0:02:13.266325 ovlp:
(0.9956763956763957+0.07104067104067102j)
3 Execution time: 0:02:13.268764 ovlp:
(0.990960390960391+0.10857070857070861j)
4 Execution time: 0:02:13.271746 ovlp:
(0.983918783918784+0.14144234144234136j)
5 Execution time: 0:02:13.275428 ovlp:

```

```

(0.9749691749691749+0.1760023760023759j)
6 Execution time: 0:02:13.279581  ovlp:
(0.9639351639351639+0.2110664110664111j)
7 Execution time: 0:02:13.284256  ovlp:
(0.950967950967951+0.24524844524844536j)
8 Execution time: 0:02:13.290319  ovlp:
(0.9362187362187362+0.2751968751968752j)
9 Execution time: 0:02:13.297420  ovlp:
(0.9206523206523207+0.30846810846810846j)
x_points = [np.float64(0.0), np.float64(0.21300878448788152),
np.float64(0.42601756897576304), np.float64(0.6390263534636446),
np.float64(0.8520351379515261), np.float64(1.0650439224394077),
np.float64(1.2780527069272891), np.float64(1.4910614914151705),
np.float64(1.7040702759030522), np.float64(1.9170790603909338)] y_points
= [1.          +0.j
0.999031599031599 +0.03635463635463632j
0.9956763956763957+0.07104067104067102j
0.990960390960391 +0.10857070857070861j
0.983918783918784 +0.14144234144234136j
0.9749691749691749+0.1760023760023759j
0.9639351639351639+0.2110664110664111j
0.950967950967951 +0.24524844524844536j
0.9362187362187362+0.2751968751968752j
0.9206523206523207+0.30846810846810846j]
fit1: [ 0.6234299068655818 -0.26979526107952995]
[ 0.6234299068655818 -0.26979526107952995  0.37657009313441825
-0.          ] 2.2220018365405542e-11
[ 5.3318152520213746e-01 -2.8194390485608933e-01
3.3246231176742241e-01
-5.5016077965406376e-02  1.2532704884578340e-06]
5.5894085030843956e-11
E_gs: -0.28194390485608933
test mps sampling took: (0.00130462646484375, Counter({2: 5, 0: 5}))
truncated ham size: 10  Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172  dt: 0.1718523607577854
1 Execution time: 0:02:13.784739  ovlp:
(0.9992855975710317+0.030320303089030443j)
2 Execution time: 0:02:13.786658  ovlp:
(0.9974995914986111+0.05733079492470283j)
3 Execution time: 0:02:13.789137  ovlp:
(0.9943607808266548+0.08781449856929524j)
4 Execution time: 0:02:13.792161  ovlp:
(0.9893447637721968+0.11656539632234741j)
5 Execution time: 0:02:13.795746  ovlp:
(0.9830291422990838+0.14238268410112598j)

```



```

6 Execution time: 0:02:13.799909  ovlp:
(0.9771467222988559+0.1723875861177928j)
7 Execution time: 0:02:13.804587  ovlp:
(0.9685358930220362+0.20092568314732273j)
8 Execution time: 0:02:13.810028  ovlp:
(0.9587014595849626+0.2307405845179873j)
9 Execution time: 0:02:13.815979  ovlp:
(0.9467694190160247+0.25427026451889945j)
10 Execution time: 0:02:13.822589  ovlp:
(0.9362889833825434+0.27971515103151345j)
11 Execution time: 0:02:13.829783  ovlp:
(0.9224493363277435+0.303206830903225j)
12 Execution time: 0:02:13.838838  ovlp:
(0.9077964865080541+0.3277397143150287j)
13 Execution time: 0:02:13.848760  ovlp:
(0.8926876351379596+0.3506689922745738j)
14 Execution time: 0:02:13.858026  ovlp:
(0.878110785576671+0.37280786754674966j)
15 Execution time: 0:02:13.869489  ovlp:
(0.8605167257568676+0.39616274695333975j)
16 Execution time: 0:02:13.880254  ovlp:
(0.8423450639732175+0.4210908317088278j)
17 Execution time: 0:02:13.891319  ovlp:
(0.8230409983393943+0.4406228981178535j)
18 Execution time: 0:02:13.904860  ovlp:
(0.8017989261163487+0.4549793469297796j)
19 Execution time: 0:02:13.917458  ovlp:
(0.7830724624463723+0.4739110112974385j)
x_points = [np.float64(0.0), np.float64(0.1718523607577854),
np.float64(0.3437047215155708), np.float64(0.5155570822733562),
np.float64(0.6874094430311416), np.float64(0.859261803788927),
np.float64(1.0311141645467123), np.float64(1.2029665253044979),
np.float64(1.3748188860622832), np.float64(1.5466712468200685),
np.float64(1.718523607577854), np.float64(1.8903759683356394),
np.float64(2.0622283290934247), np.float64(2.23408068985121),
np.float64(2.4059330506089958), np.float64(2.577785411366781),
np.float64(2.7496377721245664), np.float64(2.9214901328823517),
np.float64(3.093342493640137), np.float64(3.265194854397923)] y_points =
[1.          +0.j
0.9992855975710317+0.03032030308903044j
0.9974995914986111+0.05733079492470283j
0.9943607808266548+0.08781449856929524j
0.9893447637721968+0.11656539632234741j
0.9830291422990838+0.14238268410112598j
0.9771467222988559+0.1723875861177928j
0.9685358930220362+0.20092568314732273j
0.9587014595849626+0.2307405845179873j

```

```

0.9467694190160247+0.25427026451889945j
0.9362889833825434+0.27971515103151345j
0.9224493363277435+0.303206830903225j
0.9077964865080541+0.3277397143150287j
0.8926876351379596+0.3506689922745738j
0.878110785576671 +0.37280786754674966j
0.8605167257568676+0.39616274695333975j
0.8423450639732175+0.4210908317088278j
0.8230409983393943+0.4406228981178535j
0.8017989261163487+0.4549793469297796j
0.7830724624463723+0.4739110112974385j ]
fit1: [ 0.6304715081257624 -0.26396034659724754]
[ 0.5623220971330762 -0.27935198474013423 0.42066770128658487
-0.02414202377796909] 1.2817561875878802e-09
[ 0.485142904346239 -0.29625638375556557 0.3169931978106721
-0.07415516903121386 -0.00277529282800215] 8.332206684249872e-10
E_gs: -0.29625638375556557
test mps sampling took: (0.0012695789337158203, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 10
shots per matrix element: 555555.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1655592540708946
1 Execution time: 0:02:14.304450 ovlp:
(0.9993267993267994+0.02901422901422901j)
2 Execution time: 0:02:14.306332 ovlp:
(0.9976275976275977+0.05752985752985751j)
3 Execution time: 0:02:14.308778 ovlp:
(0.9948843948843948+0.08522108522108529j)
4 Execution time: 0:02:14.311842 ovlp:
(0.9905139905139906+0.11109071109071111j)
5 Execution time: 0:02:14.315430 ovlp:
(0.985016785016785+0.1374499374499374j)
6 Execution time: 0:02:14.319562 ovlp:
(0.9780363780363781+0.16340236340236336j)
7 Execution time: 0:02:14.324427 ovlp:
(0.9697419697419698+0.19079119079119078j)
8 Execution time: 0:02:14.329726 ovlp:
(0.9617643617643619+0.21783081783081792j)
9 Execution time: 0:02:14.335672 ovlp:
(0.9512739512739512+0.24397404397404387j)
x_points = [np.float64(0.0), np.float64(0.1655592540708946),
np.float64(0.3311185081417892), np.float64(0.49667776221268384),
np.float64(0.6622370162835785), np.float64(0.827796270354473),
np.float64(0.9933555244253677), np.float64(1.1589147784962623),
np.float64(1.324474032567157), np.float64(1.4900332866380515)] y_points
= [1. +0.j
0.9993267993267994+0.02901422901422901j

```

0.9976275976275977+0.05752985752985751j
0.9948843948843948+0.08522108522108529j
0.9905139905139906+0.11109071109071111j
0.985016785016785 +0.1374499374499374j
0.9780363780363781+0.16340236340236336j
0.9697419697419698+0.19079119079119078j
0.9617643617643619+0.21783081783081792j
0.9512739512739512+0.24397404397404387j
fit1: [0.6138046691143149 -0.273735302218342]
[0.6138046691143149 -0.273735302218342 0.38619533088568514
-0.] 3.0081559356012515e-11
[4.8376291543756950e-01 -2.8861075254962920e-01
3.3936066163273743e-01
-8.3441904657805710e-02 1.1059440313675355e-06]
4.240436511948339e-11
E_gs: -0.2886107525496292
test mps sampling took: (0.0012726783752441406, Counter({0: 8, 2: 2}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.09164377256799054
1 Execution time: 0:02:14.979146 ovlp:
(0.9998459998459999+0.01610621610621621j)
2 Execution time: 0:02:14.981094 ovlp:
(0.9992871992871992+0.03434863434863433j)
3 Execution time: 0:02:14.983661 ovlp:
(0.9983103983103983+0.04587224587224581j)
4 Execution time: 0:02:14.986970 ovlp:
(0.996994796994797+0.06354266354266347j)
5 Execution time: 0:02:14.990738 ovlp:
(0.9955515955515954+0.08174548174548169j)
6 Execution time: 0:02:14.994944 ovlp:
(0.9933163933163933+0.0914254914254915j)
7 Execution time: 0:02:15.000608 ovlp:
(0.9910195910195909+0.10792550792550792j)
8 Execution time: 0:02:15.007304 ovlp:
(0.9882827882827883+0.12264352264352274j)
9 Execution time: 0:02:15.013896 ovlp:
(0.9844591844591846+0.13356873356873367j)
10 Execution time: 0:02:15.020862 ovlp:
(0.9808555808555808+0.15350075350075354j)
11 Execution time: 0:02:15.028265 ovlp:
(0.977960377960378+0.16768636768636758j)
x_points = [np.float64(0.0), np.float64(0.09164377256799054),
np.float64(0.18328754513598108), np.float64(0.2749313177039716),
np.float64(0.36657509027196217), np.float64(0.4582188628399527),
np.float64(0.5498626354079432), np.float64(0.6415064079759338),

```

np.float64(0.7331501805439243), np.float64(0.8247939531119148),
np.float64(0.9164377256799054), np.float64(1.008081498247896)] y_points
= [1.          +0.j
0.9998459998459999+0.01610621610621621j
0.9992871992871992+0.03434863434863433j
0.9983103983103983+0.04587224587224581j
0.996994796994797 +0.06354266354266347j
0.9955515955515954+0.08174548174548169j
0.9933163933163933+0.0914254914254915j
0.9910195910195909+0.10792550792550792j
0.9882827882827883+0.12264352264352274j
0.9844591844591846+0.13356873356873367j
0.9808555808555808+0.15350075350075354j
0.977960377960378 +0.16768636768636758j]
fit1: [ 0.6037097141963957 -0.2793584009545  ]
[ 0.6037097141963957 -0.2793584009545  0.39629028580360426
-0.          ] 5.023673815590896e-10
[ 5.1182642309220627e-01 -2.7391176632681535e-01
3.2505708694711705e-01
-8.7340289651901729e-02 2.4785921051344181e-06]
5.912046883751281e-10
E_gs: -0.27391176632681535
test mps sampling took: (0.0013003349304199219, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.2512915076386108
1 Execution time: 0:02:15.532264 ovlp:
(0.9986847978956765+0.04234086774538848j)
2 Execution time: 0:02:15.534177 ovlp:
(0.9941343906150251+0.08320813313301301j)
3 Execution time: 0:02:15.536744 ovlp:
(0.9874047798476477+0.1266194025910441j)
4 Execution time: 0:02:15.539783 ovlp:
(0.9775167640268225+0.16757306811690897j)
5 Execution time: 0:02:15.543328 ovlp:
(0.9655359448575118+0.21216513946422322j)
6 Execution time: 0:02:15.547625 ovlp:
(0.9500607200971523+0.24252998804798098j)
7 Execution time: 0:02:15.552425 ovlp:
(0.9327710924337478+0.28114124982599975j)
8 Execution time: 0:02:15.557788 ovlp:
(0.9135134616215386+0.3182549092078548j)
9 Execution time: 0:02:15.563735 ovlp:
(0.8898686237897981+0.3547541676066681j)
10 Execution time: 0:02:15.570174 ovlp:
(0.8660797857276572+0.38914142262627616j)

```

```

11 Execution time: 0:02:15.577516  ovlp:
(0.8394397431035889+0.42114787383659813j)
12 Execution time: 0:02:15.585421  ovlp:
(0.8125981001569602+0.4501207201931523j)
13 Execution time: 0:02:15.593972  ovlp:
(0.781686050697681+0.4731415570264912j)
14 Execution time: 0:02:15.603092  ovlp:
(0.7501404002246403+0.49789039662463463j)
15 Execution time: 0:02:15.612693  ovlp:
(0.7186811498898398+0.5232248371597394j)
16 Execution time: 0:02:15.622947  ovlp:
(0.6889307022891236+0.5431352690164304j)
17 Execution time: 0:02:15.633889  ovlp:
(0.6506650410640658+0.5592056947291115j)
18 Execution time: 0:02:15.647670  ovlp:
(0.6196185913897463+0.5729625167400267j)
19 Execution time: 0:02:15.660063  ovlp:
(0.5819673311477298+0.5842713348341357j)
20 Execution time: 0:02:15.672876  ovlp:
(0.5505656809050894+0.5963289541263266j)
21 Execution time: 0:02:15.686053  ovlp:
(0.5122136195417912+0.6019929631887411j)
22 Execution time: 0:02:15.702436  ovlp:
(0.4780759649215438+0.6072345715753145j)
23 Execution time: 0:02:15.717243  ovlp:
(0.44493671189873907+0.6069465711145139j)
24 Execution time: 0:02:15.734825  ovlp:
(0.4122198595517752+0.6079353726965964j)
x_points = [np.float64(0.0), np.float64(0.2512915076386108),
np.float64(0.5025830152772216), np.float64(0.7538745229158323),
np.float64(1.0051660305544432), np.float64(1.256457538193054),
np.float64(1.5077490458316647), np.float64(1.7590405534702755),
np.float64(2.0103320611088864), np.float64(2.2616235687474973),
np.float64(2.512915076386108), np.float64(2.764206584024719),
np.float64(3.0154980916633294), np.float64(3.2667895993019402),
np.float64(3.518081106940551), np.float64(3.769372614579162),
np.float64(4.020664122217773), np.float64(4.271955629856383),
np.float64(4.5232471374949945), np.float64(4.774538645133605),
np.float64(5.025830152772216), np.float64(5.277121660410827),
np.float64(5.528413168049438), np.float64(5.779704675688048),
np.float64(6.030996183326659)] y_points = [1.          +0.j
0.9986847978956765 +0.04234086774538848j
0.9941343906150251 +0.08320813313301301j
0.9874047798476477 +0.1266194025910441j
0.9775167640268225 +0.16757306811690897j
0.9655359448575118 +0.21216513946422322j
0.9500607200971523 +0.24252998804798098j

```

0.9327710924337478 +0.28114124982599975j
0.9135134616215386 +0.3182549092078548j
0.8898686237897981 +0.3547541676066681j
0.8660797857276572 +0.38914142262627616j
0.8394397431035889 +0.42114787383659813j
0.8125981001569602 +0.4501207201931523j
0.781686050697681 +0.4731415570264912j
0.7501404002246403 +0.49789039662463463j
0.7186811498898398 +0.5232248371597394j
0.6889307022891236 +0.5431352690164304j
0.6506650410640658 +0.5592056947291115j
0.6196185913897463 +0.5729625167400267j
0.5819673311477298 +0.5842713348341357j
0.5505656809050894 +0.5963289541263266j
0.5122136195417912 +0.6019929631887411j
0.4780759649215438 +0.6072345715753145j
0.44493671189873907+0.6069465711145139j
0.4122198595517752 +0.6079353726965964j]
fit1: [0.618944880899793 -0.2581413161186401]
[0.4051083129623384 -0.31400257730771486 0.4342916082007626
-0.090087271731081] 8.10311409039162e-09
[0.37831553208521607 -0.3285780618520074 0.3475476577410945
-0.08868016506416156 -0.04975300336560474] 9.9874636668581e-10
E_gs: -0.3285780618520074
test mps sampling took: (0.0012929439544677734, Counter({2: 8, 0: 2}))
truncated ham size: 10 Number of fitting points: 22
shots per matrix element: 238095.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.05254484625171398
1 Execution time: 0:02:16.308193 ovlp:
(0.9999243999243999+0.007799407799407909j)
2 Execution time: 0:02:16.310093 ovlp:
(0.9997815997815998+0.01913941913941919j)
3 Execution time: 0:02:16.312568 ovlp:
(0.9994119994119994+0.028765828765828783j)
4 Execution time: 0:02:16.316124 ovlp:
(0.9991263991263992+0.035015435015435026j)
5 Execution time: 0:02:16.320043 ovlp:
(0.9984291984291984+0.04243264243264244j)
6 Execution time: 0:02:16.324558 ovlp:
(0.9978579978579978+0.04941304941304936j)
7 Execution time: 0:02:16.329334 ovlp:
(0.9969591969591969+0.06208866208866204j)
8 Execution time: 0:02:16.334761 ovlp:
(0.995993195993196+0.06696066696066705j)
9 Execution time: 0:02:16.340769 ovlp:
(0.9946827946827947+0.08091308091308091j)

```

10 Execution time: 0:02:16.347363  ovlp:
(0.9935571935571936+0.0902790902790902j)
11 Execution time: 0:02:16.355454  ovlp:
(0.9924315924315925+0.09595749595749603j)
12 Execution time: 0:02:16.364820  ovlp:
(0.9911295911295912+0.10848190848190842j)
13 Execution time: 0:02:16.373624  ovlp:
(0.9892815892815894+0.11533631533631539j)
14 Execution time: 0:02:16.382714  ovlp:
(0.9886263886263886+0.12517272517272526j)
15 Execution time: 0:02:16.392451  ovlp:
(0.9861567861567861+0.12879312879312876j)
16 Execution time: 0:02:16.402686  ovlp:
(0.9845523845523845+0.13997353997354j)
17 Execution time: 0:02:16.415672  ovlp:
(0.982947982947983+0.1467859467859467j)
18 Execution time: 0:02:16.427485  ovlp:
(0.9798063798063799+0.15694155694155687j)
19 Execution time: 0:02:16.440061  ovlp:
(0.978084378084378+0.16338436338436346j)
20 Execution time: 0:02:16.452807  ovlp:
(0.9756483756483756+0.17523677523677517j)
21 Execution time: 0:02:16.466135  ovlp:
(0.9728343728343729+0.18038598038598042j)
x_points = [np.float64(0.0), np.float64(0.05254484625171398),
np.float64(0.10508969250342796), np.float64(0.15763453875514194),
np.float64(0.21017938500685593), np.float64(0.2627242312585699),
np.float64(0.3152690775102839), np.float64(0.3678139237619979),
np.float64(0.42035877001371186), np.float64(0.4729036162654258),
np.float64(0.5254484625171398), np.float64(0.5779933087688538),
np.float64(0.6305381550205678), np.float64(0.6830830012722817),
np.float64(0.7356278475239958), np.float64(0.7881726937757098),
np.float64(0.8407175400274237), np.float64(0.8932623862791377),
np.float64(0.9458072325308516), np.float64(0.9983520787825657),
np.float64(1.0508969250342797), np.float64(1.1034417712859936)] y_points
= [1.          +0.j
0.9999243999243999+0.00779940779940791j
0.9997815997815998+0.01913941913941919j
0.9994119994119994+0.02876582876582878j
0.9991263991263992+0.03501543501543503j
0.9984291984291984+0.04243264243264244j
0.9978579978579978+0.04941304941304936j
0.9969591969591969+0.06208866208866204j
0.995993195993196 +0.06696066696066705j
0.9946827946827947+0.08091308091308091j
0.9935571935571936+0.0902790902790902j
0.9924315924315925+0.09595749595749603j

```

```

0.9911295911295912+0.10848190848190842j
0.9892815892815894+0.11533631533631539j
0.9886263886263886+0.12517272517272526j
0.9861567861567861+0.12879312879312876j
0.9845523845523845+0.13997353997354j
0.982947982947983 +0.1467859467859467j
0.9798063798063799+0.15694155694155687j
0.978084378084378 +0.16338436338436346j
0.9756483756483756+0.17523677523677517j
0.9728343728343729+0.18038598038598042j]
fit1: [ 0.6291624322358128 -0.26668602907375655]
[ 0.6291624322358128 -0.26668602907375655 0.3708375677641872
-0.          ] 3.0455084035662436e-10
[ 5.133630280413067e-01 -2.823669136101886e-01
2.925364655349658e-01
-7.813602954487275e-02 2.401935747289611e-06]
3.2624770546488476e-10
E_gs: -0.2823669136101886
test mps sampling took: (0.0013074874877929688, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 12
shots per matrix element: 454545.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.06795065627024208
1 Execution time: 0:02:17.024739 ovlp:
(0.9999251999251999+0.013268213268213369j)
2 Execution time: 0:02:17.026753 ovlp:
(0.9996127996127997+0.020317020317020207j)
3 Execution time: 0:02:17.029326 ovlp:
(0.999071599071599+0.034084634084634136j)
4 Execution time: 0:02:17.032919 ovlp:
(0.9983147983147984+0.04596904596904605j)
5 Execution time: 0:02:17.036839 ovlp:
(0.9974127974127973+0.054865854865854935j)
6 Execution time: 0:02:17.041758 ovlp:
(0.9964755964755965+0.07019547019547012j)
7 Execution time: 0:02:17.047461 ovlp:
(0.995041195041195+0.08351428351428347j)
8 Execution time: 0:02:17.053120 ovlp:
(0.9934131934131933+0.09141229141229146j)
9 Execution time: 0:02:17.059231 ovlp:
(0.9915695915695917+0.10149710149710156j)
10 Execution time: 0:02:17.065795 ovlp:
(0.9896731896731896+0.11564311564311569j)
11 Execution time: 0:02:17.073019 ovlp:
(0.9870771870771871+0.1257675257675257j)
x_points = [np.float64(0.0), np.float64(0.06795065627024208),
np.float64(0.13590131254048415), np.float64(0.20385196881072623),

```



```

np.float64(0.2718026250809683), np.float64(0.3397532813512104),
np.float64(0.40770393762145246), np.float64(0.4756545938916945),
np.float64(0.5436052501619366), np.float64(0.6115559064321787),
np.float64(0.6795065627024208), np.float64(0.7474572189726628)] y_points
= [1.          +0.j
0.9999251999251999+0.01326821326821337j
0.9996127996127997+0.02031702031702021j
0.999071599071599 +0.03408463408463414j
0.9983147983147984+0.04596904596904605j
0.9974127974127973+0.05486585486585493j
0.9964755964755965+0.07019547019547012j
0.995041195041195 +0.08351428351428347j
0.9934131934131933+0.09141229141229146j
0.9915695915695917+0.10149710149710156j
0.9896731896731896+0.11564311564311569j
0.9870771870771871+0.1257675257675257j ]
fit1: [ 0.582834820629234 -0.29282327156415866]
[ 0.582834820629234 -0.29282327156415866 0.417165179370766
-0.          ] 1.2987872736872436e-10
[ 4.9068951539290312e-01 -2.8175312425954036e-01
3.5507408737880508e-01
-8.7555123581364136e-02 2.7612386091148302e-06]
1.1449022161423178e-10
E_gs: -0.28175312425954036
test mps sampling took: (0.001306295394897461, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.0921977778223848
1 Execution time: 0:02:17.624916 ovlp:
(0.999824+0.0154019999999999916j)
2 Execution time: 0:02:17.626843 ovlp: (0.99922+0.031236000000000004j)
3 Execution time: 0:02:17.629357 ovlp:
(0.998264+0.043822000000000003j)
4 Execution time: 0:02:17.632425 ovlp:
(0.99710800000000001+0.0624240000000000035j)
5 Execution time: 0:02:17.635995 ovlp:
(0.995398+0.078413999999999998j)
x_points = [np.float64(0.0), np.float64(0.0921977778223848),
np.float64(0.1843955556447696), np.float64(0.27659333346715437),
np.float64(0.3687911112895392), np.float64(0.46098888911924)] y_points =
[1.          +0.j
0.999824          +0.015401999999999992j
0.99922          +0.031236000000000004j
0.998264          +0.043822000000000003j
0.99710800000000001+0.062424000000000004j
0.995398          +0.078413999999999998j]

```

fit1: [0.5860608097514446 -0.29396483425637276]
[0.5860608097514446 -0.29396483425637276 0.4139391902485554
-0.] 1.039375646712965e-10
[5.2307323793322524e-01 -2.5074210294898563e-01
3.7772488917639041e-01
-1.0771403972320358e-01 6.7828694283906257e-07]
9.360290144666494e-11
E_gs: -0.25074210294898563
test mps sampling took: (0.0013163089752197266, Counter({2: 5, 0: 5}))
truncated ham size: 10 Number of fitting points: 20
shots per matrix element: 263157.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.15221823075758564
1 Execution time: 0:02:18.137920 ovlp:
(0.9994679981911938+0.02725749267547517j)
2 Execution time: 0:02:18.139827 ovlp:
(0.9978643927389352+0.04941156799933122j)
3 Execution time: 0:02:18.142285 ovlp:
(0.995508384728508+0.07712886223813165j)
4 Execution time: 0:02:18.145407 ovlp:
(0.992042772945428+0.10202654689025947j)
5 Execution time: 0:02:18.149255 ovlp:
(0.9869203555292088+0.13126384629707744j)
6 Execution time: 0:02:18.153564 ovlp:
(0.9816535376220279+0.15054511185338026j)
7 Execution time: 0:02:18.159122 ovlp:
(0.975254315864674+0.17473599410238005j)
8 Execution time: 0:02:18.165688 ovlp:
(0.9673502889909826+0.20334249136447058j)
9 Execution time: 0:02:18.172348 ovlp:
(0.958914260308485+0.2259069680836916j)
10 Execution time: 0:02:18.179036 ovlp:
(0.9490494267680509+0.24676903901473257j)
11 Execution time: 0:02:18.186490 ovlp:
(0.9386221913154504+0.27213032524310576j)
12 Execution time: 0:02:18.194406 ovlp:
(0.9274273532530011+0.29233879395189954j)
13 Execution time: 0:02:18.203037 ovlp:
(0.9155257127874235+0.31499447098120137j)
14 Execution time: 0:02:18.212124 ovlp:
(0.9035860721926454+0.3381821498193094j)
15 Execution time: 0:02:18.221878 ovlp:
(0.889442424104242+0.35446140516877755j)
16 Execution time: 0:02:18.232124 ovlp:
(0.8743335727341472+0.37896388847722084j)
17 Execution time: 0:02:18.243135 ovlp:
(0.8580923175138795+0.3979867531549608j)

```

18 Execution time: 0:02:18.254524 ovlp:
(0.8435534680817915+0.41451680935715185j)
19 Execution time: 0:02:18.266684 ovlp:
(0.8249410047994163+0.43622248315644274j)
x_points = [np.float64(0.0), np.float64(0.15221823075758564),
np.float64(0.3044364615151713), np.float64(0.4566546922727569),
np.float64(0.6088729230303426), np.float64(0.7610911537879282),
np.float64(0.9133093845455138), np.float64(1.0655276153030995),
np.float64(1.2177458460606851), np.float64(1.3699640768182708),
np.float64(1.5221823075758565), np.float64(1.6744005383334422),
np.float64(1.8266187690910276), np.float64(1.9788369998486133),
np.float64(2.131055230606199), np.float64(2.283273461363785),
np.float64(2.4354916921213703), np.float64(2.5877099228789557),
np.float64(2.7399281536365416), np.float64(2.892146384394127)] y_points
= [1.          +0.j
0.9994679981911938+0.02725749267547517j
0.9978643927389352+0.04941156799933122j
0.995508384728508 +0.07712886223813165j
0.992042772945428 +0.10202654689025947j
0.9869203555292088+0.13126384629707744j
0.9816535376220279+0.15054511185338026j
0.975254315864674 +0.17473599410238005j
0.9673502889909826+0.20334249136447058j
0.958914260308485 +0.2259069680836916j
0.9490494267680509+0.24676903901473257j
0.9386221913154504+0.27213032524310576j
0.9274273532530011+0.29233879395189954j
0.9155257127874235+0.31499447098120137j
0.9035860721926454+0.3381821498193094j
0.889442424104242 +0.35446140516877755j
0.8743335727341472+0.37896388847722084j
0.8580923175138795+0.3979867531549608j
0.8435534680817915+0.41451680935715185j
0.8249410047994163+0.43622248315644274j]
fit1: [ 0.6310022706432328 -0.2641662432299843]
[ 0.6310022706432328 -0.2641662432299843  0.3689977293567672
-0.          ] 7.210033229979169e-10
[ 4.6390121778488252e-01 -3.0304573655506367e-01
3.5874327672601442e-01
-7.5450087658297860e-02 -5.6856401519427046e-07]
4.074696168168536e-10
E_gs: -0.30304573655506367
test mps sampling took: (0.0013051033020019531, Counter({2: 6, 0: 4}))
truncated ham size: 10 Number of fitting points: 5
shots per matrix element: 1250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.12457363153456266

```

1 Execution time: 0:02:18.598196 ovlp:
(0.9996592+0.021190400000000054j)

2 Execution time: 0:02:18.600071 ovlp: (0.998624+0.04181759999999999j)

3 Execution time: 0:02:18.602525 ovlp:
(0.9969488+0.063758399999999999j)

4 Execution time: 0:02:18.605587 ovlp:
(0.9945088+0.084273599999999995j)

x_points = [np.float64(0.0), np.float64(0.12457363153456266),
np.float64(0.24914726306912532), np.float64(0.37372089460368796),
np.float64(0.49829452613825065)] y_points = [1. +0.j
0.9996592+0.02119040000000005j
0.998624 +0.04181759999999999j 0.9969488+0.063758399999999999j
0.9945088+0.084273599999999995j]

fit1: [0.5910999889923428 -0.29556112744022567]
[0.5910999889923428 -0.29556112744022567 0.40890001100765716
-0.] 3.053697076834743e-11
[5.3312430768757590e-01 -2.5582932671523845e-01
3.7625785567919412e-01
-1.0118931659925041e-01 6.1552711999889313e-07]
2.709000187862761e-11
E_gs: -0.25582932671523845
test mps sampling took: (0.0013461112976074219, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 14
shots per matrix element: 384615.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.10912486683131842

1 Execution time: 0:02:19.166421 ovlp:
(0.9997243997243996+0.020163020163020073j)

2 Execution time: 0:02:19.168384 ovlp:
(0.998996398996399+0.03634023634023631j)

3 Execution time: 0:02:19.170836 ovlp:
(0.9977847977847978+0.05677625677625686j)

4 Execution time: 0:02:19.173872 ovlp:
(0.9956319956319957+0.07468507468507468j)

5 Execution time: 0:02:19.177457 ovlp:
(0.9935155935155935+0.09023309023309034j)

6 Execution time: 0:02:19.181592 ovlp:
(0.9905931905931906+0.10854230854230851j)

7 Execution time: 0:02:19.186347 ovlp:
(0.9872703872703872+0.12470912470912476j)

8 Execution time: 0:02:19.191721 ovlp:
(0.9836043836043835+0.1434031434031433j)

9 Execution time: 0:02:19.199413 ovlp:
(0.9784043784043783+0.1627679627679628j)

10 Execution time: 0:02:19.206500 ovlp:
(0.9740051740051741+0.1849511849511849j)

11 Execution time: 0:02:19.213789 ovlp:

```

(0.9686439686439687+0.20045240045240043j)
12 Execution time: 0:02:19.221595  ovlp:
(0.9621179621179621+0.21355121355121365j)
13 Execution time: 0:02:19.231113  ovlp:
(0.9558311558311559+0.2333528333528334j)
x_points = [np.float64(0.0), np.float64(0.10912486683131842),
np.float64(0.21824973366263684), np.float64(0.3273746004939553),
np.float64(0.43649946732527367), np.float64(0.5456243341565921),
np.float64(0.6547492009879106), np.float64(0.763874067819229),
np.float64(0.8729989346505473), np.float64(0.9821238014818657),
np.float64(1.0912486683131841), np.float64(1.2003735351445026),
np.float64(1.3094984019758211), np.float64(1.4186232688071394)] y_points
= [1.          +0.j
0.9997243997243996+0.02016302016302007j
0.998996398996399 +0.03634023634023631j
0.9977847977847978+0.05677625677625686j
0.9956319956319957+0.07468507468507468j
0.9935155935155935+0.09023309023309034j
0.9905931905931906+0.10854230854230851j
0.9872703872703872+0.12470912470912476j
0.9836043836043835+0.1434031434031433j
0.9784043784043783+0.1627679627679628j
0.9740051740051741+0.1849511849511849j
0.9686439686439687+0.20045240045240043j
0.9621179621179621+0.21355121355121365j
0.9558311558311559+0.2333528333528334j ]
fit1: [ 0.6437017952258505 -0.26160932649765745]
[ 0.6437017952258505 -0.26160932649765745 0.35629820477414953
-0.          ] 1.9595096771351098e-10
[ 5.3371784016786195e-01 -2.7930394506518974e-01
2.5395438408596888e-01
-7.6948772827072881e-02 4.3201663955707324e-06]
2.1943532389849892e-10
E_gs: -0.27930394506518974
test mps sampling took: (0.0012726783752441406, Counter({0: 5, 2: 5}))
truncated ham size: 10 Number of fitting points: 10
shots per matrix element: 55555.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.06302981705469989
1 Execution time: 0:02:19.636572  ovlp:
(0.9999171999171999+0.007734607734607657j)
2 Execution time: 0:02:19.638463  ovlp:
(0.9996543996543996+0.020255420255420153j)
3 Execution time: 0:02:19.640938  ovlp:
(0.9991827991827993+0.031300231300231296j)
4 Execution time: 0:02:19.644506  ovlp:
(0.9985383985383984+0.043317043317043336j)

```

```

5 Execution time: 0:02:19.648387 ovlp:
(0.9978435978435978+0.05362385362385358j)
6 Execution time: 0:02:19.652909 ovlp:
(0.996961596961597+0.062343062343062305j)
7 Execution time: 0:02:19.658382 ovlp:
(0.9954243954243953+0.07198027198027201j)
8 Execution time: 0:02:19.664874 ovlp:
(0.9941931941931943+0.08438588438588446j)
9 Execution time: 0:02:19.671554 ovlp:
(0.9926307926307927+0.09517869517869526j)
x_points = [np.float64(0.0), np.float64(0.06302981705469989),
np.float64(0.12605963410939977), np.float64(0.18908945116409964),
np.float64(0.25211926821879954), np.float64(0.31514908527349944),
np.float64(0.3781789023281993), np.float64(0.4412087193828992),
np.float64(0.5042385364375991), np.float64(0.567268353492299)] y_points
= [1.          +0.j
0.9999171999171999+0.00773460773460766j
0.9996543996543996+0.02025542025542015j
0.9991827991827993+0.0313002313002313j
0.9985383985383984+0.04331704331704334j
0.9978435978435978+0.05362385362385358j
0.996961596961597 +0.06234306234306231j
0.9954243954243953+0.07198027198027201j
0.9941931941931943+0.08438588438588446j
0.9926307926307927+0.09517869517869526j]
fit1: [ 0.579528788526395 -0.2909119494138617]
[ 0.579528788526395 -0.2909119494138617 0.420471211473605
-0.          ] 4.952810804489571e-11
[ 5.2460802024220732e-01 -2.5296713834141543e-01
3.8826028537386564e-01
-9.8305225602172211e-02 5.8704257265600511e-07]
1.4008091541191975e-10
E_gs: -0.25296713834141543
test mps sampling took: (0.0013012886047363281, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.08913681255485102
1 Execution time: 0:02:20.315108 ovlp:
(0.9998880000000001+0.014199999999999999j)
2 Execution time: 0:02:20.317013 ovlp:
(0.9990399999999999+0.02918400000000001j)
3 Execution time: 0:02:20.319462 ovlp:
(0.9985360000000001+0.045671999999999935j)
4 Execution time: 0:02:20.323102 ovlp:
(0.9972000000000001+0.05983200000000011j)
5 Execution time: 0:02:20.326994 ovlp:

```

```

(0.9956240000000001+0.07895199999999991j)
6 Execution time: 0:02:20.331523  ovlp:
(0.9936400000000001+0.08899999999999997j)
7 Execution time: 0:02:20.337001  ovlp:
(0.9912479999999999+0.10082400000000002j)
8 Execution time: 0:02:20.343448  ovlp: (0.988408+0.1213200000000001j)
9 Execution time: 0:02:20.350106  ovlp:
(0.9859039999999999+0.13429599999999997j)
10 Execution time: 0:02:20.356772  ovlp:
(0.982224+0.14805599999999997j)
11 Execution time: 0:02:20.364768  ovlp:
(0.9783520000000001+0.16369600000000006j)
12 Execution time: 0:02:20.374144  ovlp: (0.974256+0.1788400000000001j)
13 Execution time: 0:02:20.382736  ovlp:
(0.9712799999999999+0.19068799999999997j)
14 Execution time: 0:02:20.392006  ovlp: (0.966208+0.202488j)
15 Execution time: 0:02:20.401645  ovlp: (0.9610879999999999+0.218928j)
16 Execution time: 0:02:20.411920  ovlp:
(0.954952+0.23656799999999999j)
17 Execution time: 0:02:20.422888  ovlp:
(0.949648+0.24674400000000007j)
18 Execution time: 0:02:20.436682  ovlp:
(0.943424+0.26048000000000004j)
19 Execution time: 0:02:20.449108  ovlp:
(0.936936+0.27435199999999993j)
20 Execution time: 0:02:20.462054  ovlp:
(0.931384+0.28581600000000007j)
x_points = [np.float64(0.0), np.float64(0.08913681255485102),
np.float64(0.17827362510970204), np.float64(0.2674104376645531),
np.float64(0.3565472502194041), np.float64(0.4456840627742551),
np.float64(0.5348208753291062), np.float64(0.6239576878839571),
np.float64(0.7130945004388082), np.float64(0.8022313129936592),
np.float64(0.8913681255485102), np.float64(0.9805049381033613),
np.float64(1.0696417506582123), np.float64(1.1587785632130634),
np.float64(1.2479153757679142), np.float64(1.3370521883227653),
np.float64(1.4261890008776164), np.float64(1.5153258134324674),
np.float64(1.6044626259873185), np.float64(1.6935994385421693),
np.float64(1.7827362510970204)] y_points = [1.          +0.j
0.9998880000000001+0.01419999999999999j
0.9990399999999999+0.02918400000000001j
0.9985360000000001+0.04567199999999993j
0.9972000000000001+0.05983200000000011j
0.9956240000000001+0.07895199999999991j
0.9936400000000001+0.08899999999999997j
0.9912479999999999+0.10082400000000002j
0.988408          +0.1213200000000001j
0.9859039999999999+0.13429599999999997j

```

```

0.982224      +0.14805599999999997j
0.97835200000000001+0.16369600000000006j
0.974256      +0.17884000000000001j
0.9712799999999999+0.19068799999999997j
0.966208      +0.202488j
0.9610879999999999+0.218928j
0.954952      +0.23656799999999999j
0.949648      +0.24674400000000007j
0.943424      +0.26048000000000004j
0.936936      +0.27435199999999993j
0.931384      +0.28581600000000007j]
fit1: [ 0.6249433069519892 -0.26854539643411746]
[ 0.6249433069519892 -0.26854539643411746 0.3750566930480108
-0.          ] 3.8897679505824683e-10
[ 5.2219823041760094e-01 -2.8477455331008555e-01
2.8992575611752752e-01
-6.6721701751226853e-02 3.2093424356063814e-06]
3.9389333292851464e-10
E_gs: -0.28477455331008555
test mps sampling took: (0.0012865066528320312, Counter({2: 7, 0: 3}))
truncated ham size: 10 Number of fitting points: 25
shots per matrix element: 208333.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.1312411570646914
1 Execution time: 0:02:20.916081 ovlp:
(0.9995871993395189+0.022075235320376585j)
2 Execution time: 0:02:20.917964 ovlp:
(0.9985407976652763+0.044817671708274665j)
3 Execution time: 0:02:20.920426 ovlp:
(0.9965631945011113+0.07056491290386058j)
4 Execution time: 0:02:20.923451 ovlp:
(0.9940959905535849+0.08994734391575032j)
5 Execution time: 0:02:20.927128 ovlp:
(0.990275184440295+0.11163377861404578j)
6 Execution time: 0:02:20.931331 ovlp:
(0.9864351782962852+0.12976820762913222j)
7 Execution time: 0:02:20.936164 ovlp:
(0.9816831706930731+0.15204984327974924j)
8 Execution time: 0:02:20.942270 ovlp:
(0.974617559388095+0.17496507994412802j)
9 Execution time: 0:02:20.949472 ovlp:
(0.969164750663601+0.19629631407410253j)
10 Execution time: 0:02:20.956758 ovlp:
(0.9619551391282226+0.21662914660663457j)
11 Execution time: 0:02:20.964003 ovlp:
(0.9536895259032414+0.23831558130493002j)
12 Execution time: 0:02:20.972723 ovlp:

```



```

(0.9455583128933007+0.257390811825299j)
13 Execution time: 0:02:20.982698 ovlp:
(0.9337790940465505+0.2783188453101526j)
14 Execution time: 0:02:20.991951 ovlp:
(0.9282014851223761+0.2981524770439632j)
15 Execution time: 0:02:21.001619 ovlp:
(0.9165374664599464+0.3188117100987362j)
16 Execution time: 0:02:21.014444 ovlp:
(0.9051134481815171+0.3374261398818239j)
17 Execution time: 0:02:21.025917 ovlp:
(0.8943134309014895+0.3509525615240985j)
18 Execution time: 0:02:21.037416 ovlp:
(0.881267010027216+0.3685877897404637j)
19 Execution time: 0:02:21.049433 ovlp:
(0.8664829863727781+0.38531101649762634j)
20 Execution time: 0:02:21.062318 ovlp:
(0.8546269674031479+0.4019190430704689j)
21 Execution time: 0:02:21.078495 ovlp:
(0.8421277474043958+0.41879587007339203j)
22 Execution time: 0:02:21.092685 ovlp:
(0.828918126269002+0.4314006902411043j)
23 Execution time: 0:02:21.107445 ovlp:
(0.8153245045192072+0.4443703109924977j)
24 Execution time: 0:02:21.122421 ovlp:
(0.7948188717101947+0.4646839434943095j)
x_points = [np.float64(0.0), np.float64(0.1312411570646914),
np.float64(0.2624823141293828), np.float64(0.39372347119407414),
np.float64(0.5249646282587656), np.float64(0.656205785323457),
np.float64(0.7874469423881483), np.float64(0.9186880994528397),
np.float64(1.049929256517531), np.float64(1.1811704135822225),
np.float64(1.312411570646914), np.float64(1.4436527277116054),
np.float64(1.5748938847762965), np.float64(1.706135041840988),
np.float64(1.8373761989056794), np.float64(1.9686173559703708),
np.float64(2.099858513035062), np.float64(2.2310996700997534),
np.float64(2.362340827164445), np.float64(2.4935819842291362),
np.float64(2.624823141293828), np.float64(2.756064298358519),
np.float64(2.8873054554232107), np.float64(3.018546612487902),
np.float64(3.149787769552593)] y_points = [1.          +0.j
0.9995871993395189+0.02207523532037658j
0.9985407976652763+0.04481767170827466j
0.9965631945011113+0.07056491290386058j
0.9940959905535849+0.08994734391575032j
0.990275184440295 +0.11163377861404578j
0.9864351782962852+0.12976820762913222j
0.9816831706930731+0.15204984327974924j
0.974617559388095 +0.17496507994412802j
0.969164750663601 +0.19629631407410253j

```

```

0.9619551391282226+0.21662914660663457j
0.9536895259032414+0.23831558130493002j
0.9455583128933007+0.257390811825299j
0.9337790940465505+0.2783188453101526j
0.9282014851223761+0.2981524770439632j
0.9165374664599464+0.3188117100987362j
0.9051134481815171+0.3374261398818239j
0.8943134309014895+0.3509525615240985j
0.881267010027216 +0.3685877897404637j
0.8664829863727781+0.38531101649762634j
0.8546269674031479+0.4019190430704689j
0.8421277474043958+0.41879587007339203j
0.828918126269002 +0.4314006902411043j
0.8153245045192072+0.4443703109924977j
0.7948188717101947+0.4646839434943095j ]
fit1: [ 0.6336687200756781 -0.26235637239746473]
[ 0.6336687200756781 -0.26235637239746473 0.3663312799243219
-0.          ] 4.635817461232666e-09
[ 4.8741315477902591e-01 -2.9423005520415690e-01
3.1382840058433115e-01
-7.6191397780048575e-02 -1.3299500015859943e-06]
2.3652242266105628e-09
E_gs: -0.2942300552041569
test mps sampling took: (0.001252889633178711, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 6
shots per matrix element: 1000000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.06512053863110774
1 Execution time: 0:02:21.455149 ovlp: (0.9999+0.0100800000000000089j)
2 Execution time: 0:02:21.457053 ovlp:
(0.99956+0.02103000000000000104j)
3 Execution time: 0:02:21.459523 ovlp:
(0.9991239999999999+0.03182400000000000074j)
4 Execution time: 0:02:21.463117 ovlp: (0.998526+0.04415199999999997j)
5 Execution time: 0:02:21.467022 ovlp:
(0.997638+0.054667999999999994j)
x_points = [np.float64(0.0), np.float64(0.06512053863110774),
np.float64(0.13024107726221548), np.float64(0.19536161589332324),
np.float64(0.26048215452443096), np.float64(0.3256026931555387)]
y_points = [1.          +0.j
0.9999          +0.010080000000000009j
0.99956         +0.021030000000000001j
0.9991239999999999+0.031824000000000007j
0.998526        +0.04415199999999997j
0.997638        +0.054667999999999994j]
fit1: [ 0.34204083026660265 -0.5134402075971736 ]
[ 0.34204083026660265 -0.5134402075971736 0.34205083016660265

```

```

-0.          ] 9.887296525091153e-11
[ 2.9302995965219636e-01 -4.4014227380955251e-01
2.9290524624981940e-01
-1.5665808568016726e-01 1.4398022866220815e-06]
3.849354420089522e-11
E_gs: -0.4401422738095525
test mps sampling took: (0.001268148422241211, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.039857941557753344
1 Execution time: 0:02:21.914836 ovlp:
(0.9999551999551999+0.00699580699580693j)
2 Execution time: 0:02:21.916806 ovlp:
(0.9998179998179999+0.014446614446614436j)
3 Execution time: 0:02:21.919374 ovlp:
(0.9996499996499997+0.02070742070742071j)
4 Execution time: 0:02:21.922629 ovlp:
(0.9994231994231995+0.02782782782782789j)
5 Execution time: 0:02:21.926353 ovlp:
(0.999039599039599+0.03309743309743318j)
6 Execution time: 0:02:21.930516 ovlp:
(0.9988071988071987+0.03866103866103865j)
7 Execution time: 0:02:21.935382 ovlp:
(0.9983283983283984+0.04798784798784794j)
x_points = [np.float64(0.0), np.float64(0.039857941557753344),
np.float64(0.07971588311550669), np.float64(0.11957382467326003),
np.float64(0.15943176623101338), np.float64(0.19928970778876673),
np.float64(0.23914764934652005), np.float64(0.2790055909042734)]
y_points = [1.          +0.j
0.9999551999551999+0.00699580699580693j
0.9998179998179999+0.01444661444661444j
0.9996499996499997+0.02070742070742071j
0.9994231994231995+0.02782782782782789j
0.999039599039599 +0.03309743309743318j
0.9988071988071987+0.03866103866103865j
0.9983283983283984+0.04798784798784794j]
fit1: [ 0.34151625060035085 -0.5133039271978476 ]
[ 0.34151625060035085 -0.5133039271978476  0.34152625050035085
-0.          ] 8.541621913507143e-11
[ 2.8830471882506387e-01 -4.3392335016301359e-01
2.8806648286491304e-01
-1.6927907072019022e-01 1.5708177261237831e-06]
3.968013768102174e-11
E_gs: -0.4339233501630136
test mps sampling took: (0.0013527870178222656, Counter({0: 6, 2: 4}))
truncated ham size: 10 Number of fitting points: 23

```

shots per matrix element: 227272.0

Total gate count: 172 2 qubit gates: 80

N gate: 172 dt: 0.2874520214705926

1 Execution time: 0:02:22.386236 ovlp:

(0.9982047942553416+0.0486553556971383j)

2 Execution time: 0:02:22.388127 ovlp:

(0.9928103769932064+0.09630750818402611j)

3 Execution time: 0:02:22.390545 ovlp:

(0.984071949030237+0.14476046323348224j)

4 Execution time: 0:02:22.393525 ovlp:

(0.9699127037206519+0.18811820197824636j)

5 Execution time: 0:02:22.397216 ovlp:

(0.9548998556795383+0.23614875567601823j)

6 Execution time: 0:02:22.401378 ovlp:

(0.9350733922348551+0.27988489563166596j)

7 Execution time: 0:02:22.406079 ovlp:

(0.911726917526136+0.32427223767116065j)

8 Execution time: 0:02:22.412382 ovlp:

(0.8858020345665105+0.36016755253616806j)

9 Execution time: 0:02:22.419389 ovlp:

(0.859076349044317+0.39439966207891874j)

10 Execution time: 0:02:22.426648 ovlp:

(0.8276250484001548+0.43516139251645614j)

11 Execution time: 0:02:22.434659 ovlp:

(0.7963761484036749+0.4637350839522687j)

12 Execution time: 0:02:22.443487 ovlp:

(0.7609208349466718+0.49561758597627503j)

13 Execution time: 0:02:22.453009 ovlp:

(0.7242775176880567+0.5184800591361893j)

14 Execution time: 0:02:22.463147 ovlp:

(0.6852141926854165+0.5431993382378824j)

15 Execution time: 0:02:22.472846 ovlp:

(0.6479460734274349+0.5640290048928156j)

16 Execution time: 0:02:22.483127 ovlp:

(0.6064803407370905+0.5775458481467142j)

17 Execution time: 0:02:22.494002 ovlp:

(0.5677514168045337+0.5935530993699181j)

18 Execution time: 0:02:22.507502 ovlp:

(0.5262328839452286+0.6017459255869619j)

19 Execution time: 0:02:22.519835 ovlp:

(0.4870815586609878+0.6058027385687634j)

20 Execution time: 0:02:22.532720 ovlp:

(0.44895103664331737+0.6082051462564679j)

21 Execution time: 0:02:22.545914 ovlp:

(0.40991411172515746+0.6083987468759899j)

22 Execution time: 0:02:22.559821 ovlp:

(0.3747843993100779+0.6043595339505086j)

```

x_points = [np.float64(0.0), np.float64(0.2874520214705926),
np.float64(0.5749040429411852), np.float64(0.8623560644117778),
np.float64(1.1498080858823705), np.float64(1.4372601073529632),
np.float64(1.7247121288235556), np.float64(2.0121641502941485),
np.float64(2.299616171764741), np.float64(2.5870681932353334),
np.float64(2.8745202147059263), np.float64(3.161972236176519),
np.float64(3.4494242576471112), np.float64(3.736876279117704),
np.float64(4.024328300588297), np.float64(4.3117803220588895),
np.float64(4.599232343529482), np.float64(4.886684365000074),
np.float64(5.174136386470667), np.float64(5.46158840794126),
np.float64(5.749040429411853), np.float64(6.036492450882445),
np.float64(6.323944472353038)] y_points = [1.          +0.j
0.9982047942553416 +0.0486553556971383j
0.9928103769932064 +0.09630750818402611j
0.984071949030237  +0.14476046323348224j
0.9699127037206519 +0.18811820197824636j
0.9548998556795383 +0.23614875567601823j
0.9350733922348551 +0.27988489563166596j
0.911726917526136  +0.32427223767116065j
0.8858020345665105 +0.36016755253616806j
0.859076349044317  +0.39439966207891874j
0.8276250484001548 +0.43516139251645614j
0.7963761484036749 +0.4637350839522687j
0.7609208349466718 +0.49561758597627503j
0.7242775176880567 +0.5184800591361893j
0.6852141926854165 +0.5431993382378824j
0.6479460734274349 +0.5640290048928156j
0.6064803407370905 +0.5775458481467142j
0.5677514168045337 +0.5935530993699181j
0.5262328839452286 +0.6017459255869619j
0.4870815586609878 +0.6058027385687634j
0.44895103664331737+0.6082051462564679j
0.40991411172515746+0.6083987468759899j
0.3747843993100779 +0.6043595339505086j ]
fit1: [ 0.6178290954537558 -0.2571381211562715]
[ 0.4021041637123969 -0.31489414388582104  0.4539669427456666
-0.08770412772970108] 8.943305898625791e-09
[ 0.38454450687655617 -0.32629217035669195  0.40833379763799915
-0.08080629828634686 -0.04957596371282483] 6.31426011491467e-10
E_gs: -0.32629217035669195
test mps sampling took: (0.0012667179107666016, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 8
shots per matrix element: 714285.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.07210489987985781
1 Execution time: 0:02:23.092120 ovlp:
(0.9998711998711998+0.012971012971012996j)

```

```

2 Execution time: 0:02:23.094044 ovlp:
(0.9994931994931995+0.024523824523824622j)
3 Execution time: 0:02:23.096536 ovlp:
(0.998969598969599+0.037804237804237806j)
4 Execution time: 0:02:23.099570 ovlp:
(0.9981323981323982+0.04829304829304837j)
5 Execution time: 0:02:23.103238 ovlp:
(0.996956396956397+0.06066906066906075j)
6 Execution time: 0:02:23.107454 ovlp:
(0.9958027958027957+0.0740754740754741j)
7 Execution time: 0:02:23.112206 ovlp:
(0.9945315945315945+0.08615468615468624j)
x_points = [np.float64(0.0), np.float64(0.07210489987985781),
np.float64(0.14420979975971562), np.float64(0.21631469963957345),
np.float64(0.28841959951943125), np.float64(0.36052449939928904),
np.float64(0.4326293992791469), np.float64(0.5047342991590047)]
y_points = [1.          +0.j
0.9998711998711998+0.012971012971013j
0.9994931994931995+0.02452382452382462j
0.998969598969599 +0.03780423780423781j
0.9981323981323982+0.04829304829304837j
0.996956396956397 +0.06066906066906075j
0.9958027958027957+0.0740754740754741j
0.9945315945315945+0.08615468615468624j]
fit1: [ 0.5921175996850971 -0.29627560434263817]
[ 0.5921175996850971 -0.29627560434263817 0.40788240031490286
-0.          ] 5.2177256475344625e-11
[ 5.338064402744990e-01 -2.562154229700488e-01
3.752416132250543e-01
-1.025707056001019e-01 6.164836658585216e-07]
4.7191350939505624e-11
E_gs: -0.2562154229700488
test mps sampling took: (0.0012431144714355469, Counter({0: 7, 2: 3}))
truncated ham size: 10 Number of fitting points: 21
shots per matrix element: 250000.0
Total gate count: 172 2 qubit gates: 80
N gate: 172 dt: 0.036776443685168005
1 Execution time: 0:02:23.664518 ovlp:
(0.999992+0.00449600000000000555j)
2 Execution time: 0:02:23.666428 ovlp:
(0.9998720000000001+0.015023999999999926j)
3 Execution time: 0:02:23.668882 ovlp:
(0.99976+0.0242160000000000015j)
4 Execution time: 0:02:23.671920 ovlp:
(0.999512+0.023423999999999989j)
5 Execution time: 0:02:23.675539 ovlp:
(0.9991920000000001+0.033400000000000096j)

```

6 Execution time: 0:02:23.679659 ovlp:
(0.998864+0.035312000000000001j)

7 Execution time: 0:02:23.684326 ovlp:
(0.99828800000000001+0.043015999999999994j)

8 Execution time: 0:02:23.689838 ovlp:
(0.99784000000000001+0.053463999999999956j)

9 Execution time: 0:02:23.695811 ovlp:
(0.997568+0.0549040000000000064j)

10 Execution time: 0:02:23.703343 ovlp:
(0.996696+0.06560000000000001j)

11 Execution time: 0:02:23.711528 ovlp:
(0.9965999999999999+0.06496799999999991j)

12 Execution time: 0:02:23.719763 ovlp:
(0.995584+0.07328000000000001j)

13 Execution time: 0:02:23.728239 ovlp:
(0.99497600000000001+0.07671199999999989j)

14 Execution time: 0:02:23.737446 ovlp:
(0.993992+0.084832000000000002j)

15 Execution time: 0:02:23.747236 ovlp:
(0.993304+0.093712000000000002j)

16 Execution time: 0:02:23.757536 ovlp:
(0.9923599999999999+0.09718399999999994j)

17 Execution time: 0:02:23.768385 ovlp:
(0.991072+0.10407199999999994j)

18 Execution time: 0:02:23.779805 ovlp:
(0.99028+0.112648000000000008j)

19 Execution time: 0:02:23.791923 ovlp:
(0.9892799999999999+0.113712000000000004j)

20 Execution time: 0:02:23.804600 ovlp:
(0.98809600000000001+0.12513599999999991j)

x_points = [np.float64(0.0), np.float64(0.036776443685168005),
np.float64(0.07355288737033601), np.float64(0.11032933105550402),
np.float64(0.14710577474067202), np.float64(0.18388221842584002),
np.float64(0.22065866211100804), np.float64(0.257435105796176),
np.float64(0.29421154948134404), np.float64(0.33098799316651206),
np.float64(0.36776443685168003), np.float64(0.40454088053684806),
np.float64(0.4413173242220161), np.float64(0.47809376790718405),
np.float64(0.514870211592352), np.float64(0.5516466552775201),
np.float64(0.5884230989626881), np.float64(0.625199542647856),
np.float64(0.6619759863330241), np.float64(0.6987524300181921),
np.float64(0.7355288737033601)] y_points = [1. +0.j
0.999992 +0.004496000000000006j
0.99987200000000001+0.015023999999999993j
0.99976 +0.024216000000000002j
0.999512 +0.023423999999999989j
0.99919200000000001+0.03340000000000001j
0.998864 +0.035312000000000001j

```
0.9982880000000001+0.04301599999999994j  
0.9978400000000001+0.05346399999999996j  
0.997568      +0.05490400000000006j  
0.996696      +0.06560000000000001j  
0.996599999999999+0.06496799999999991j  
0.995584      +0.07328000000000001j  
0.9949760000000001+0.076711999999999989j  
0.993992      +0.08483200000000002j  
0.993304      +0.09371200000000002j  
0.992359999999999+0.09718399999999994j  
0.991072      +0.10407199999999994j  
0.99028       +0.11264800000000008j  
0.989279999999999+0.11371200000000004j  
0.9880960000000001+0.12513599999999991j]  
fit1: [ 0.6261323950215162 -0.26916185413156113]  
[ 0.6261323950215162 -0.26916185413156113  0.3738676049784838  
-0.          ] 9.892530578733774e-10  
[ 5.7207719974049620e-01 -2.3502575794433997e-01  
3.4744696172266243e-01  
-9.8652258585739311e-02  5.5109957769680038e-07]  
1.2229531129381482e-09  
E_gs: -0.23502575794433997  
Data written successfully to 08qubits_05A.X.data  
Data written successfully to 08qubits_05A.Y.data  
>> Miner succeeded! Mined 250 records  
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>  
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>  
Running kcl_adapt_vqe_stage_1.py with prefix 08qubits_05  
res=miner(n_qubits, ham, repeats, 5, X_file, Y_file,  
generate_hyper_params_avqe, wrapper_avqe, compress_avqe)  
Resolving package versions...  
No Changes to `~/./julia/environments/pyjuliapkg/Project.toml`  
No Changes to `~/./julia/environments/pyjuliapkg/Manifest.toml`  
Resolving package versions...  
No Changes to `~/./julia/environments/pyjuliapkg/Project.toml`  
No Changes to `~/./julia/environments/pyjuliapkg/Manifest.toml`  
test mps sampling took: (22.445549964904785, Counter({2: 8, 0: 2}))  
/usr/local/lib/python3.10/site-packages/stopit/__init__.py:10: UserWarning:  
pkg_resources is deprecated as an API. See https://setuptools.pypa.io/en/  
latest/pkg_resources.html. The pkg_resources package is slated for removal as  
early as 2025-11-30. Refrain from using this package or pin to Setuptools<81.  
import pkg_resources  
>> Start Stage 1  
>> Read ham ../hamiltonian/, 08qubits_05.data  
08qubits_05  
>> Start processing: 08qubits_05.data with qubits 8  
>> Running Miner
```



```

>>>> adding ham of size 30
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)

```

iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2

new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]

index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]

index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)

iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)

iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52

θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 36
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 36
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 36
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 36
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 36

FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 36
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 44
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 44
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 44
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 44
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list

QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52

θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]

index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)

iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)

iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)

iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)

iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)

iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)

iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)

iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)

iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 41
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)

iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 41
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)

iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 41
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)

iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 41
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 41
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')

θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4

new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
θ: [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]

QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 41
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 41
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 41
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 41
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 41
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)

iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)

iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)

iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)

iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)

iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)

iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)

iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)

iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)

iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)

iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)

iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')

θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52

θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3

selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list

QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5

new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52

θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52

θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)

iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52

θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')

θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
ignored list emptied: [] -> []
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
ignored list emptied: [] -> []
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 40
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 40
40
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 40
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 40
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]

index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)

iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list

QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 48
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 48
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 48
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 48
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 48
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 48
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2

new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
θ: [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52

FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4

new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
θ: [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]

QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2

new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]

QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]

index 46 added to ignored list
 QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
 iteration: 5
 new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
 index 51 added to ignored list
 QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
 iteration: 6
 new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
 index 12 added to ignored list
 QSCI energy: -0.6175164811952343, (new generator X3 Y4)
 iteration: 1
 new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
 QSCI energy: -0.5824512859670712, (new generator X3 Y5)
 iteration: 2
 new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
 QSCI energy: -0.6175164811952343, (new generator X2 Y4)
 iteration: 3
 selected second largest gradient
 index 8 added to ignored list
 new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
 index 13 added to ignored list
 QSCI energy: -0.6175164811952343, (new generator X3 Y5)
 iteration: 4
 new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
 index 46 added to ignored list
 QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
 iteration: 5
 new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
 index 51 added to ignored list
 QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
 iteration: 1
 new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
 QSCI energy: -0.5824512859670712, (new generator X3 Y5)
 iteration: 2
 new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
 QSCI energy: -0.6175164811952343, (new generator X2 Y4)
 iteration: 3

selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52

θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52

θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2

new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52

FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')

θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
ignored list emptied: [] -> []
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 44
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 44
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 44
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 44
FUSED: ('X3 Y5', 'X3 Y5')

θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 44
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 44
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]

QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)

iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52

θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list

QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)

iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]

QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 38
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 38
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 38
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 38
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52

θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list

QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52

FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
ignored list emptied: [] -> []
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
ignored list emptied: [] -> []
iteration: 3
selected second largest gradient

index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list

QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52

FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52

θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)

iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]

index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2

new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
θ: [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)

iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]

index 8 added to ignored list
 QSCI energy: -0.6175164811952344, (new generator X2 Y4)
 iteration: 4
 new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
 index 13 added to ignored list
 QSCI energy: -0.6175164811952344, (new generator X3 Y5)
 iteration: 5
 new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
 index 46 added to ignored list
 QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
 iteration: 6
 new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
 index 51 added to ignored list
 QSCI energy: -0.6175164811952344, (new generator X2 Y3 X6 X7)
 iteration: 1
 new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
 QSCI energy: -0.5824512859670712, (new generator X3 Y5)
 iteration: 2
 new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
 QSCI energy: -0.6175164811952343, (new generator X2 Y4)
 iteration: 3
 selected second largest gradient
 index 8 added to ignored list
 new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
 index 13 added to ignored list
 QSCI energy: -0.6175164811952343, (new generator X3 Y5)
 iteration: 4
 new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
 index 46 added to ignored list
 QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
 iteration: 1
 new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
 QSCI energy: -0.5824512859670712, (new generator X3 Y5)
 iteration: 2
 new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]

QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4

new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')

θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)

iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list

QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)

iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52

θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list

QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52

θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52

θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]

index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]

index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52

FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)

iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]

index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 6
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3

new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6

new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 44
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient:
44
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 44
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 44
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient:
44
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)

iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52

θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 48
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 48
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 48
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 48
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 48
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]

QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)

iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list

QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52

FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list

QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 45
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 45
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 45
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 45
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 45
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)

iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list

QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52

FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 37
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 37
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 37
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 37
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 37
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]

index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 6
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3

selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)

iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2

new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52

θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 6
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]

index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)

iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list

QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5

new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 Y6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 45
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 45
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 45
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 45
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52

θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4

new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
θ: [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
θ: [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)

iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 37
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 37
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 37
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 37
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]

QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5

new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52

θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 6
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]

index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3

new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52

θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52

θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 6

new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
θ: [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 49
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient:
49
θ: [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 49
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 49
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient:

49

FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')

θ : [0.]

index 46 added to ignored list

QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)

iteration: 1

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52

θ : [-0.9138708053695195]

QSCI energy: -0.5824512859670712, (new generator X3 Y5)

iteration: 2

new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52

θ : [-0.45294505085990994]

QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)

iteration: 3

new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52

θ : [0.]

index 8 added to ignored list

QSCI energy: -0.6175164811952344, (new generator X2 Y4)

iteration: 4

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52

FUSED: ('X3 Y5', 'X3 Y5')

θ : [0.]

index 13 added to ignored list

QSCI energy: -0.6175164811952344, (new generator X3 Y5)

iteration: 1

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52

θ : [-0.9138708053695195]

QSCI energy: -0.5824512859670712, (new generator X3 Y5)

ignored list emptied: [] -> []

iteration: 2

new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52

θ : [-0.05481200395849985]

QSCI energy: -0.6175164811952343, (new generator X2 Y4)

ignored list emptied: [] -> []

iteration: 3

selected second largest gradient

index 8 added to ignored list

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52

FUSED: ('X3 Y5', 'X3 Y5')

θ : [0.]

index 13 added to ignored list

QSCI energy: -0.6175164811952343, (new generator X3 Y5)

iteration: 4

new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52

θ : [0.]

index 46 added to ignored list

QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)

iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 Y6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52

θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')

θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list

QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 50
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 50
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 50
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 50
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
θ: [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
θ: [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
θ: [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
θ: [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)

iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 Y3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 52
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]

index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 36
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 36
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 36
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 36
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 36
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X6 X7)
iteration: 6
new generator: ['1.0', 'X3 Y4'], index: 12 out of 52. # precise gradient: 36
 θ : [0.]
index 12 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y4)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]

index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]

index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 5
new generator: ['1.0', 'X2 X3 X6 Y7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 X6 Y7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'X2 X3 Y4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X2 X3 Y4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]

index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)

iteration: 5
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 X3 X4 Y5', 'X2 X3 X4 Y5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 6
new generator: ['1.0', 'Y2 X3 X6 X7'], index: 51 out of 52. # precise gradient: 52
 θ : [0.]
index 51 added to ignored list
QSCI energy: -0.6175164811952344, (new generator Y2 X3 X6 X7)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.4529450238116012]
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 5
new generator: ['1.0', 'X2 Y3 X4 X5'], index: 46 out of 52. # precise gradient: 52
FUSED: ('X2 Y3 X4 X5', 'X2 Y3 X4 X5')
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list

new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52
 θ : [0.]
index 46 added to ignored list
QSCI energy: -0.6175164811952343, (new generator Y2 X3 X4 X5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 X3 X4 Y5'], index: 46 out of 52. # precise gradient: 52
 θ : [-0.45294505085990994]
QSCI energy: -0.6175164811952344, (new generator X2 X3 X4 Y5)
iteration: 3
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [0.]
index 8 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X2 Y4)
iteration: 4
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952344, (new generator X3 Y5)
iteration: 1
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
 θ : [-0.9138708053695195]
QSCI energy: -0.5824512859670712, (new generator X3 Y5)
iteration: 2
new generator: ['1.0', 'X2 Y4'], index: 8 out of 52. # precise gradient: 52
 θ : [-0.05481200395849985]
QSCI energy: -0.6175164811952343, (new generator X2 Y4)
iteration: 3
selected second largest gradient
index 8 added to ignored list
new generator: ['1.0', 'X3 Y5'], index: 13 out of 52. # precise gradient: 52
FUSED: ('X3 Y5', 'X3 Y5')
 θ : [0.]
index 13 added to ignored list
QSCI energy: -0.6175164811952343, (new generator X3 Y5)
iteration: 4
new generator: ['1.0', 'Y2 X3 X4 X5'], index: 46 out of 52. # precise gradient: 52

[illegible]

[illegible]


```
np.float64(-0.34579249110007815), np.float64(-0.3481746606575223),  
np.float64(-0.34311506027191313), np.float64(-0.3364140597730551),  
np.float64(-0.3440982925160657)]  
>>>>>>>>>> Mean ABS Error: 19.16933250427246  
>>> Stat. >>> Size of TRAIN set: 367  
>>> Stat. >>> Size of TEST set: 92  
>>> Stat. >>> Size of EXTRA TEST set: 51  
>> End Training. Max Size is  
598  
total 280  
-rw-r--r-- 1 root root 47408 Jun 26 12:12 04qubits_05.X.data.npy  
-rw-r--r-- 1 root root 208 Jun 26 12:12 04qubits_05.Y.data.npy  
-rw-r--r-- 1 root root 86128 Jun 26 12:12 06qubits_05.X.data.npy  
-rw-r--r-- 1 root root 2128 Jun 26 12:12 06qubits_05.Y.data.npy  
-rw-r--r-- 1 root root 134128 Jun 26 12:12 08qubits_05.X.data.npy  
-rw-r--r-- 1 root root 2128 Jun 26 12:12 08qubits_05.Y.data.npy  
>> Running kcl_adapt_vqe_stage_2.py  
>> Start Stage 2  
>> Read ham ../hamiltonian/, 28qubits_01.data  
28qubits_01  
>> Start processing: 28qubits_01.data with qubits 28  
>>>> adding ham of size 98700  
>> Start Training  
Load data from folder ../data/  
Data loaded successfully from ../data/06qubits_05.X.data.npy  
>>> Stat. >>> Size of set loaded from: ../data/06qubits_05.X.data.npy is: 225  
Data loaded successfully from ../data/04qubits_05.X.data.npy  
>>> Stat. >>> Size of set loaded from: ../data/04qubits_05.X.data.npy is: 9  
Data loaded successfully from ../data/08qubits_05.X.data.npy  
>>> Stat. >>> Size of set loaded from: ../data/08qubits_05.X.data.npy is: 225  
Data loaded successfully from ../data/04qubits_05.Y.data.npy  
>>> Stat. >>> Size of set loaded from: ../data/04qubits_05.Y.data.npy is: 9  
Data loaded successfully from ../data/08qubits_05.Y.data.npy  
>>> Stat. >>> Size of set loaded from: ../data/08qubits_05.Y.data.npy is: 225  
Data loaded successfully from ../data/06qubits_05.Y.data.npy  
>>> Stat. >>> Size of set loaded from: ../data/06qubits_05.Y.data.npy is: 225  
Size of Xbig and Ybig: 459, 459  
>> Data loaded okay  
>> Size of each vector is: 604 with ham28 vec size 158  
>>> Train the model with size 9  
>>>>>>>>>> Mean Squared Error: 0.5369706153869629 :: Predictions:  
[-0.69579506 -0.6937973 -0.6939388 -0.7355404 -0.7330433  
-0.68017167  
-0.6960209 -1.9376099 -0.61346895 -0.61856997 -0.6188389 -0.6050169  
-0.69463974 -1.313163 -0.67882055 -0.61808145 -0.53532743 -0.6941308  
-0.69501776 -0.61487633 -1.2424684 -0.8613583 -0.62142104  
-0.69560534
```

-0.69549286 -0.69541466 -0.697179 -0.8695393 -0.83819103
-0.81584746
-0.86477065 -0.6952872 -0.6939697 -0.6334021 -0.6165536 -0.6948391
-0.6938366 -0.6114992 -0.6945992 -0.6174898 -0.82567173 -0.61773
-0.6928286 -0.6950263 -2.0005405 -0.61414766 -0.6541322
-0.60926193
-0.61436206 -0.7019931 -0.61802274 -0.69436294 -0.61869055
-0.69422305
-0.83277357 -0.6195391 -1.2831134 -0.6945541 -0.6196128 -0.9488565
-0.62529254 -0.72677064 -0.6942983 -1.5970024 -0.6988956
-0.63975453
-0.6335551 -0.69723517 -0.6195057 -1.1461537 -0.62020767 -0.69338113
-0.69500864 -0.88247573 -0.6079421 -0.6118155 -0.6955248
-0.66975546
-0.74617815 -0.69224244 -0.65521127 -0.36465734 -0.69553566
-1.0319865
-0.6952291 -0.6181023 -0.69399536 -0.69485825 -0.641619 -0.60691684
-0.5899896 -0.733689] :: True Values: [np.float64(-0.695939025880892),
np.float64(-0.695939025880892), np.float64(-0.695939025880892),
np.float64(-0.6175164811952344), np.float64(-0.695939025880892),
np.float64(-0.6175164811952343), np.float64(-0.695939025880892),
np.float64(-0.6175164811952344), np.float64(-5.251192387396458),
np.float64(-0.6175164811952343), np.float64(-0.6175164811952343),
np.float64(-0.6175164811952343), np.float64(-0.695939025880892),
np.float64(-0.6175164811952343), np.float64(-0.695939025880892),
np.float64(-0.6175164811952343), np.float64(-0.695939025880892),
np.float64(-0.6175164811952344), np.float64(-0.6175164811952343),
np.float64(-0.695939025880892), np.float64(-0.695939025880892),
np.float64(-0.6175164811952344), np.float64(-0.6175164811952343),
np.float64(-0.6175164811952344), np.float64(-0.6175164811952343),
np.float64(-0.695939025880892), np.float64(-0.695939025880892),
np.float64(-0.695939025880892), np.float64(-0.695939025880892),
np.float64(-0.6175164811952343), np.float64(-0.6175164811952344),
np.float64(-0.695939025880892), np.float64(-0.6175164811952343),
np.float64(-0.695939025880892), np.float64(-0.695939025880892),
np.float64(-0.6175164811952343), np.float64(-0.6175164811952344),
np.float64(-0.695939025880892), np.float64(-0.695939025880892),
np.float64(-0.6175164811952343), np.float64(-0.695939025880892),
np.float64(-0.6175164811952343), np.float64(-0.695939025880892),
np.float64(-0.6175164811952344), np.float64(-0.695939025880892),
np.float64(-0.695939025880892), np.float64(-0.695939025880892),
np.float64(-0.6175164811952343), np.float64(-0.6175164811952344),
np.float64(-0.6175164811952344), np.float64(-0.6175164811952344),
np.float64(-0.695939025880892), np.float64(-0.6175164811952343),
np.float64(-0.695939025880892), np.float64(-5.251192387396458),
np.float64(-0.695939025880892), np.float64(-0.6175164811952343),
np.float64(-0.6175164811952343), np.float64(-0.695939025880892),
np.float64(-0.695939025880892), np.float64(-0.6175164811952343),

[illegible]

```
np.float64(-0.695939025880892), np.float64(-0.695939025880892),  
np.float64(-0.695939025880892), np.float64(-0.695939025880892),  
np.float64(-0.695939025880892), np.float64(-0.695939025880892),  
np.float64(-0.695939025880892), np.float64(-0.695939025880892),  
np.float64(-0.695939025880892), np.float64(-0.695939025880892),  
np.float64(-0.695939025880892), np.float64(-0.695939025880892),  
np.float64(-0.695939025880892), np.float64(-0.695939025880892),  
np.float64(-0.695939025880892)]  
>>>>> Mean ABS Error: 0.10414399951696396  
>>> Stat. >>> Size of TRAIN set: 367  
>>> Stat. >>> Size of TEST set: 92  
>>> Stat. >>> Size of EXTRA TEST set: 51  
>> End Training. Max Size is  
604  
>> Phase 2 complete.  
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>  
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>  
Running kcl_QCELS_stage_3.py with prefix 20qubits_05  
/home/kclq/AccelerQ/src  
Resolving package versions...  
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`  
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`  
Resolving package versions...  
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`  
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`  
test mps sampling took: (25.310053825378418, Counter({2: 6, 0: 4}))  
test mps sampling took: (0.0015001296997070312, Counter({0: 5, 2: 5}))  
>> Start Stage 3  
>> Read ham ../hamiltonian/, 20qubits_05.data  
20qubits_05  
>> Start processing: 20qubits_05.data with qubits 20  
>>>> adding ham of size 46  
>> Running Opt. Hyperparameters  
Prediction on 20 qubits:  
>> Iteration : 1  
>> Iteration : 2  
>> Iteration : 3  
>> Iteration : 4  
>> Iteration : 5  
28  
>> Iteration : 6  
>> Iteration : 7  
>> Iteration : 8  
>> Iteration : 9  
>> Iteration : 10  
52
```

```
>> Iteration : 11
>> Iteration : 12
>> Iteration : 13
>> Iteration : 14
>> Iteration : 15
59
>> Iteration : 16
>> Iteration : 17
>> Iteration : 18
>> Iteration : 19
>> Iteration : 20
60
>> Iteration : 21
>> Iteration : 22
>> Iteration : 23
>> Iteration : 24
>> Iteration : 25
57
>> Iteration : 26
>> Iteration : 27
>> Iteration : 28
>> Iteration : 29
>> Iteration : 30
65
>> Iteration : 31
>> Iteration : 32
>> Iteration : 33
>> Iteration : 34
>> Iteration : 35
65
>> Iteration : 36
>> Iteration : 37
>> Iteration : 38
>> Iteration : 39
>> Iteration : 40
65
>> Iteration : 41
>> Iteration : 42
>> Iteration : 43
>> Iteration : 44
>> Iteration : 45
70
>> Iteration : 46
>> Iteration : 47
>> Iteration : 48
>> Iteration : 49
Pre-opt succeeded! Result: [
```

```

2.0000000000000000e+01, 1.0000000000000000e+01,
1.98547943114178699e-01,
2.4000000000000000e+01, 5.2000000000000000e+01,
8.38943134670435200e-03,
7.00433519652792436e-01 ]
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
Running kcl_adapt_vqe_stage_3.py with prefix 20qubits_05
/home/kclq/AccelerQ/src
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
test mps sampling took: (23.041041612625122, Counter({2: 7, 0: 3}))
>> Start Stage 3
>> Read ham ../hamiltonian/, 20qubits_05.data
20qubits_05
>> Start processing: 20qubits_05.data with qubits 20
>>>> adding ham of size 46
>> Running Opt. Hyperparameters
Prediction on 20 qubits:
>> Iteration : 1
>> Iteration : 2
>> Iteration : 3
>> Iteration : 4
>> Iteration : 5
FAILED.
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
Running kcl_QCELS_stage_3.py with prefix 24qubits_06
/home/kclq/AccelerQ/src
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
test mps sampling took: (22.611329555511475, Counter({0: 6, 2: 4}))
test mps sampling took: (0.0016334056854248047, Counter({0: 5, 2: 5}))
>> Start Stage 3
>> Read ham ../hamiltonian/, 24qubits_06.data
24qubits_06
>> Start processing: 24qubits_06.data with qubits 24
>>>> adding ham of size 56
>> Running Opt. Hyperparameters
```

Prediction on 24 qubits:

>> Iteration : 1

>> Iteration : 2

>> Iteration : 3

>> Iteration : 4

>> Iteration : 5

33

>> Iteration : 6

>> Iteration : 7

>> Iteration : 8

>> Iteration : 9

>> Iteration : 10

60

>> Iteration : 11

>> Iteration : 12

>> Iteration : 13

>> Iteration : 14

>> Iteration : 15

80

>> Iteration : 16

>> Iteration : 17

>> Iteration : 18

>> Iteration : 19

>> Iteration : 20

91

>> Iteration : 21

>> Iteration : 22

>> Iteration : 23

>> Iteration : 24

>> Iteration : 25

95

>> Iteration : 26

>> Iteration : 27

>> Iteration : 28

>> Iteration : 29

>> Iteration : 30

102

>> Iteration : 31

>> Iteration : 32

>> Iteration : 33

>> Iteration : 34

>> Iteration : 35

98

>> Iteration : 36

>> Iteration : 37

>> Iteration : 38

>> Iteration : 39

[illegible]

46

>> Iteration : 11
>> Iteration : 12
>> Iteration : 13
>> Iteration : 14
>> Iteration : 15

79

>> Iteration : 16
>> Iteration : 17
>> Iteration : 18
>> Iteration : 19
>> Iteration : 20

105

>> Iteration : 21
>> Iteration : 22
>> Iteration : 23
>> Iteration : 24
>> Iteration : 25

129

>> Iteration : 26
>> Iteration : 27
>> Iteration : 28
>> Iteration : 29
>> Iteration : 30

161

>> Iteration : 31
>> Iteration : 32
>> Iteration : 33
>> Iteration : 34
>> Iteration : 35

98

>> Iteration : 36
>> Iteration : 37
>> Iteration : 38
>> Iteration : 39
>> Iteration : 40

65

>> Iteration : 41
>> Iteration : 42
>> Iteration : 43
>> Iteration : 44
>> Iteration : 45

98

>> Iteration : 46
>> Iteration : 47
>> Iteration : 48
>> Iteration : 49

```
Pre-opt succeeded! Result: [
  2.4000000000000000e+01, 1.0000000000000000e+00,
  1.0000000000000000e+00,
  5.6000000000000000e+01, 9.99592768488614600e-03,
  0.0000000000000000e+00,
  9.4000000000000000e+01, 9.8992000000000000e+04,
  7.85092098963268038e-05,
  7.0000000000000000e+00, 2.6800000000000000e+02,
  3.0000000000000000e+00,
  5.8000000000000000e+01 ]
Euclidean dist: 1020.2965255654518
Number of max iteration: 94
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>
Running kcl_QCELS_stage_3.py with prefix 24qubits_07
/home/kclq/AccelerQ/src
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
test mps sampling took: (23.775649309158325, Counter({2: 6, 0: 4}))
test mps sampling took: (0.001641988754272461, Counter({0: 5, 2: 5}))
>> Start Stage 3
>> Read ham ../hamiltonian/, 24qubits_07.data
24qubits_07
>> Start processing: 24qubits_07.data with qubits 24
>>>> adding ham of size 56
>> Running Opt. Hyperparameters
Prediction on 24 qubits:
>> Iteration : 1
>> Iteration : 2
>> Iteration : 3
>> Iteration : 4
>> Iteration : 5
32
>> Iteration : 6
>> Iteration : 7
>> Iteration : 8
>> Iteration : 9
>> Iteration : 10
66
>> Iteration : 11
>> Iteration : 12
>> Iteration : 13
>> Iteration : 14
```

>> Iteration : 15

81

>> Iteration : 16

>> Iteration : 17

>> Iteration : 18

>> Iteration : 19

>> Iteration : 20

82

>> Iteration : 21

>> Iteration : 22

>> Iteration : 23

>> Iteration : 24

>> Iteration : 25

88

>> Iteration : 26

>> Iteration : 27

>> Iteration : 28

>> Iteration : 29

>> Iteration : 30

89

>> Iteration : 31

>> Iteration : 32

>> Iteration : 33

>> Iteration : 34

>> Iteration : 35

104

>> Iteration : 36

>> Iteration : 37

>> Iteration : 38

>> Iteration : 39

>> Iteration : 40

97

>> Iteration : 41

>> Iteration : 42

>> Iteration : 43

>> Iteration : 44

>> Iteration : 45

94

>> Iteration : 46

>> Iteration : 47

>> Iteration : 48

>> Iteration : 49

Pre-opt succeeded! Result: [

2.4000000000000000e+01, 1.2000000000000000e+01,

2.04504254040727335e-01,

2.0000000000000000e+01, 7.3000000000000000e+01,

9.66301755531987459e-03,

```
6.04145666018423455e-01 ]  
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>  
>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>  
Running kcl_adapt_vqe_stage_3.py with prefix 24qubits_07  
/home/kclq/AccelerQ/src  
    Resolving package versions...  
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`  
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`  
    Resolving package versions...  
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`  
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`  
test mps sampling took: (24.731044054031372, Counter({2: 7, 0: 3}))  
>> Start Stage 3  
>> Read ham ../hamiltonian/, 24qubits_07.data  
24qubits_07  
>> Start processing: 24qubits_07.data with qubits 24  
>>>> adding ham of size 56  
>> Running Opt. Hyperparameters  
Prediction on 24 qubits:  
>> Iteration : 1  
>> Iteration : 2  
>> Iteration : 3  
>> Iteration : 4  
>> Iteration : 5  
1  
>> Iteration : 6  
>> Iteration : 7  
>> Iteration : 8  
>> Iteration : 9  
>> Iteration : 10  
33  
>> Iteration : 11  
>> Iteration : 12  
>> Iteration : 13  
>> Iteration : 14  
>> Iteration : 15  
54  
>> Iteration : 16  
>> Iteration : 17  
>> Iteration : 18  
>> Iteration : 19  
>> Iteration : 20  
80  
>> Iteration : 21  
>> Iteration : 22  
>> Iteration : 23  
>> Iteration : 24
```

```
>> Iteration : 25
107
>> Iteration : 26
>> Iteration : 27
>> Iteration : 28
>> Iteration : 29
>> Iteration : 30
135
>> Iteration : 31
>> Iteration : 32
>> Iteration : 33
>> Iteration : 34
>> Iteration : 35
84
>> Iteration : 36
>> Iteration : 37
>> Iteration : 38
>> Iteration : 39
>> Iteration : 40
62
>> Iteration : 41
>> Iteration : 42
>> Iteration : 43
>> Iteration : 44
>> Iteration : 45
96
>> Iteration : 46
>> Iteration : 47
>> Iteration : 48
>> Iteration : 49
Pre-opt succeeded! Result: [
  2.4000000000000000e+01, 1.0000000000000000e+00,
  1.0000000000000000e+00,
  8.1000000000000000e+01, 9.51288494300876926e-03,
  0.0000000000000000e+00,
  5.3000000000000000e+01, 5.6963800000000000e+05,
  2.91426709888330127e-06,
  2.0000000000000000e+00, 2.2700000000000000e+02,
  3.0000000000000000e+00,
  2.6000000000000000e+01 ]
Euclidean dist: 469638.0139011322
Number of max iteration: 53
>> Done
  Resolving package versions...
  No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
  No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
  Resolving package versions...
```

No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
No Changes to `~/julia/environments/pyjuliapkg/Project.toml`
No Changes to `~/julia/environments/pyjuliapkg/Manifest.toml`
Resolving package versions...
A | B | C | D | E | F | G | H | I

=====

63636 | 91 | 14537 | 877 | 200 | 985 | 100 | 146 | 98
54717 | 287 | 14537 | 69 | 200 | 807 | 100 | 190 | 146
54723 | 445 | 14535 | 989 | 200 | 934 | 100 | 407 | 116
54710 | 338 | 14551 | 68 | 200 | 551 | 100 | 56 | 174
63636 | 65 | 14537 | 971 | 200 | 182 | 100 | 231 | 167
46 | 46 | 67 | 67 | 67 | 67 | 67 | 56 | 67
56 | 48 | 81 | 81 | 81 | 67 | 81 | 56 | 79
56 | 46 | 81 | 81 | 81 | 81 | 81 | 77 | 75
56 | 50 | 81 | 81 | 81 | 80 | 81 | 78 | 67
56 | 51 | 81 | 81 | 81 | 81 | 81 | 69 | 73
56 | 47 | 81 | 81 | 81 | 81 | 81 | 80 | 78
98700 | 167 | 42982 | 310 | 200 | 197 | 100 | 84 | 310
98700 | 158 | 42982 | 309 | 200 | 1000 | 100 | 100 | 309

98700 | 98 | 42982 | 997 | 200 | 531 | 100 | 55 | 235
98700 | 144 | 42982 | 553 | 200 | 629 | 100 | 261 | 304
98700 | 213 | 42982 | 280 | 200 | 698 | 100 | 100 | 292

>> Mapping:

- | -A: Size of Hamiltonian
- | -B: Reduced size of Ham for ML
- | -C: Ham qp size
- | -D: QCELS truncated optimised
- | -E: QCELS truncated default
- | -F: ADAPT optimised
- | -G: ADAPT default
- | -H: ADAPT truncated wt tests
- | -I: QCELS truncated wt tests

>> DONE.