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Computation time

Total	0.4525909980138143min.
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Experimental condition

Type of tomography	StandardPovmt
Nrep	100
N	[100, 1000]
RNG seed	777

True object

Type	Povm
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Dim	2
Number of outcomes	2
Vecs	[0.70710678 0.5 0. 0.5] [0.70710678 -0.5 0. -0.5]

Tester objects

0	Type	State
	Dim	2
	Vec	[0.70710678 0.70710678 0. 0.]
1	Type	State
	Dim	2
	Vec	[0.70710678 0. 0.70710678 0.]
2	Type	State
	Dim	2
	Vec	[0.70710678 0. 0. 0.70710678]
3	Type	State
	Dim	2
	Vec	[0.70710678 0. 0. -0.70710678]

Cases

	Name	Parameterization	Tomography	Estimator
0	LinearEstimator(True)	True	StandardPovmt	LinearEstimator
1	LinearEstimator(False)	False	StandardPovmt	LinearEstimator
2	ProjectedLinearEstimator(True)	True	StandardPovmt	ProjectedLinearEstimator
3	ProjectedLinearEstimator(False)	False	StandardPovmt	ProjectedLinearEstimator

MSE of empirical distributions

Mean squared error



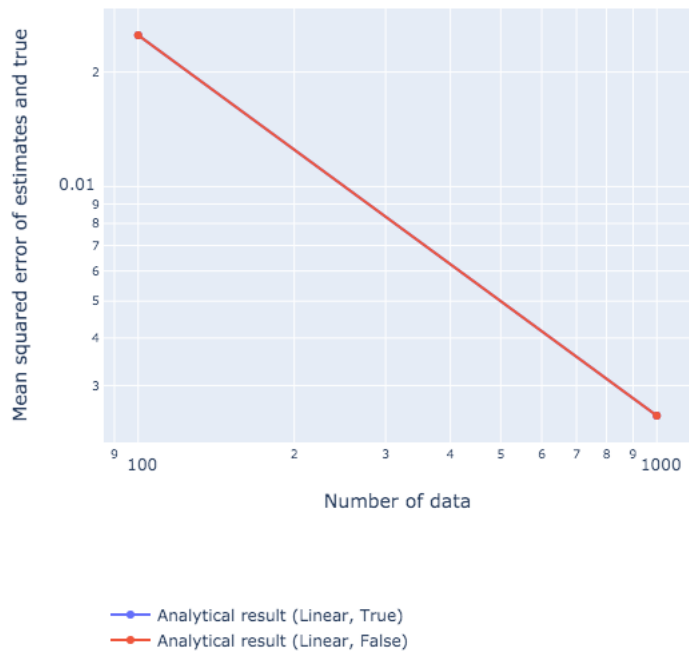
Consistency test

	Type of tomography	Parametorization	Estimator	Result
0	StandardPovmt	True	LinearEstimator	3.511452e-30
1	StandardPovmt	False	LinearEstimator	6.039716e-31
2	StandardPovmt	True	ProjectedLinearEstimator	2.278857e-30
3	StandardPovmt	False	ProjectedLinearEstimator	1.248003e-31

MSE of estimators

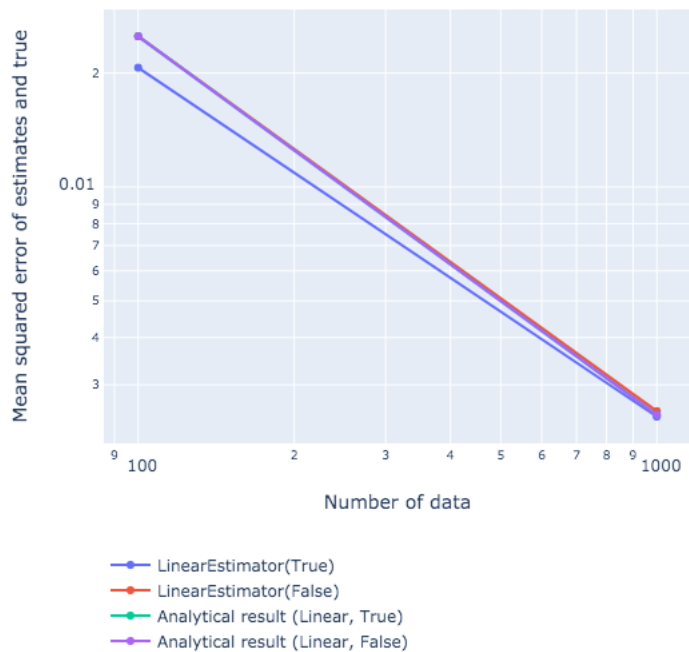
Comparison of analytical results

Mean squared error
Analytical result

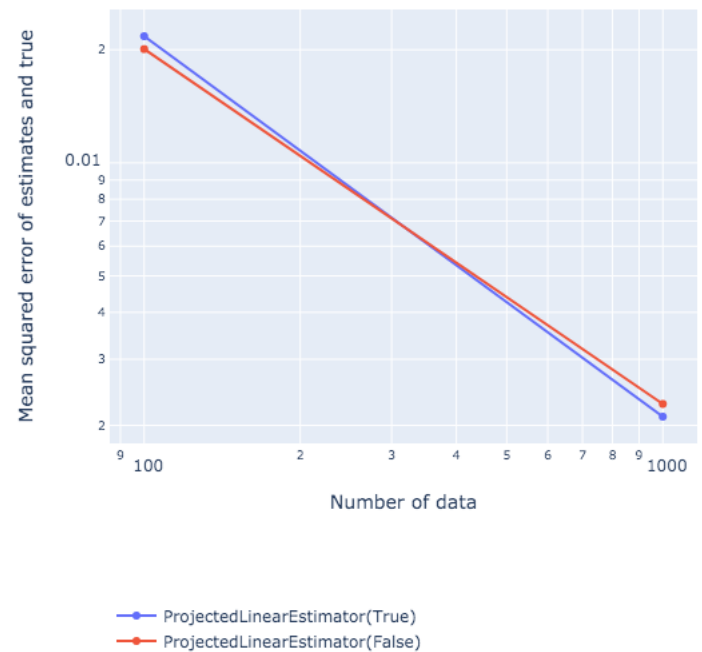


Comparison of parametrization

Mean squared error
estimator=LinearEstimator

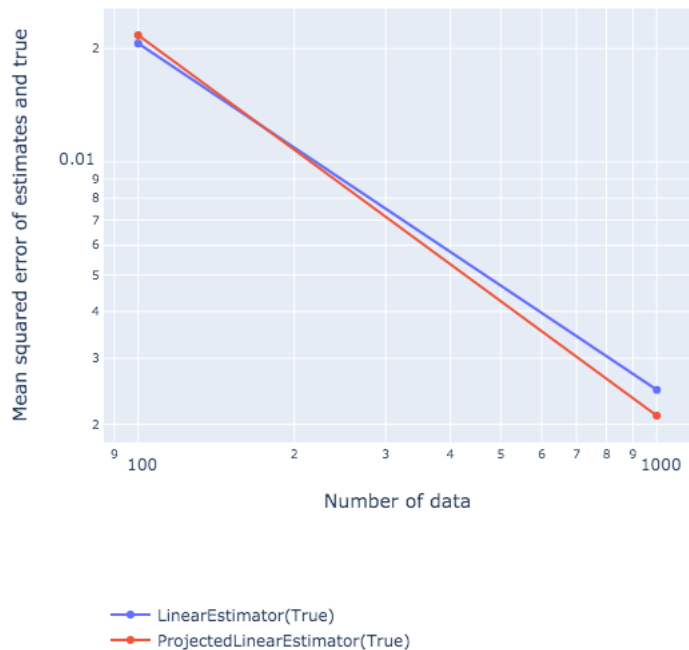


Mean squared error
estimator=ProjectedLinearEstimator

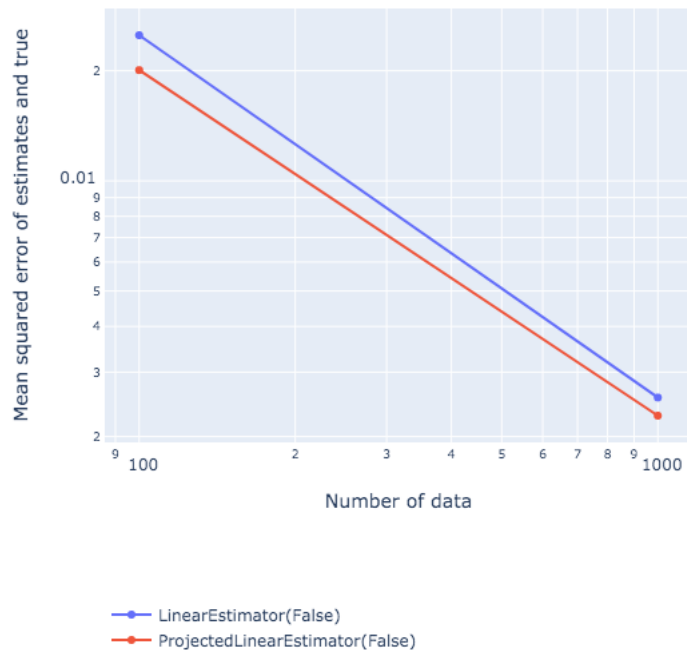


Comparison of estimators

Mean squared error
parametrization=True



Mean squared error
parametrization=False

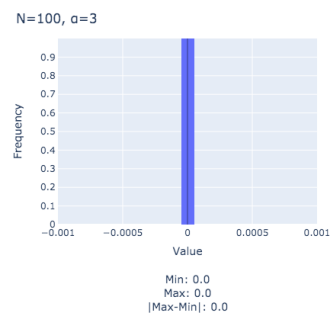
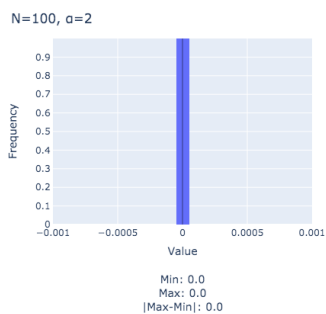
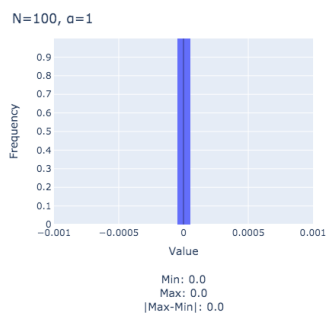
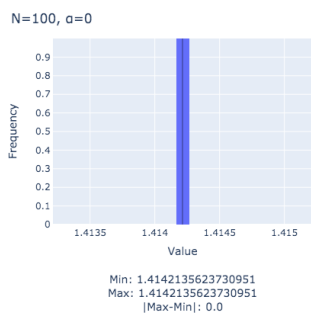


Physicality violation test

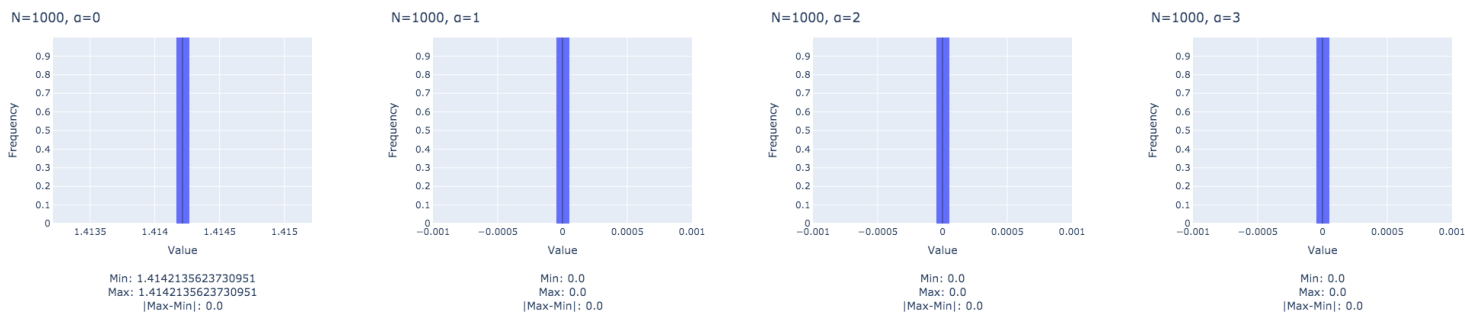
Test of equality constraint violation

Case 0: LinearEstimator(True)

N=100

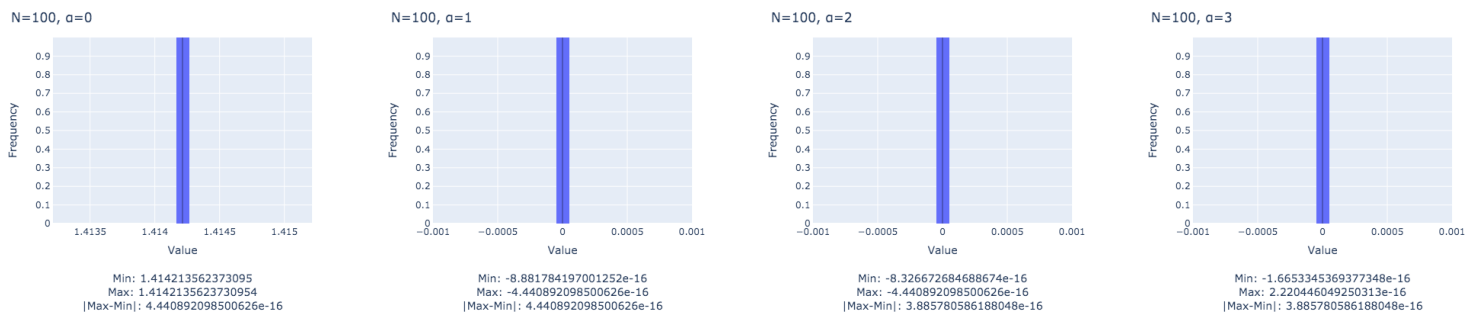


N=1000

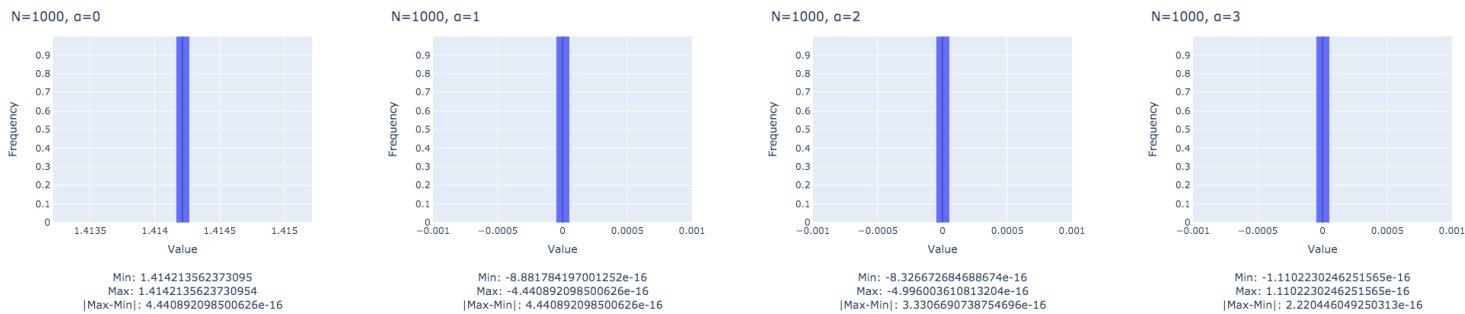


Case 1: LinearEstimator(False)

N=100

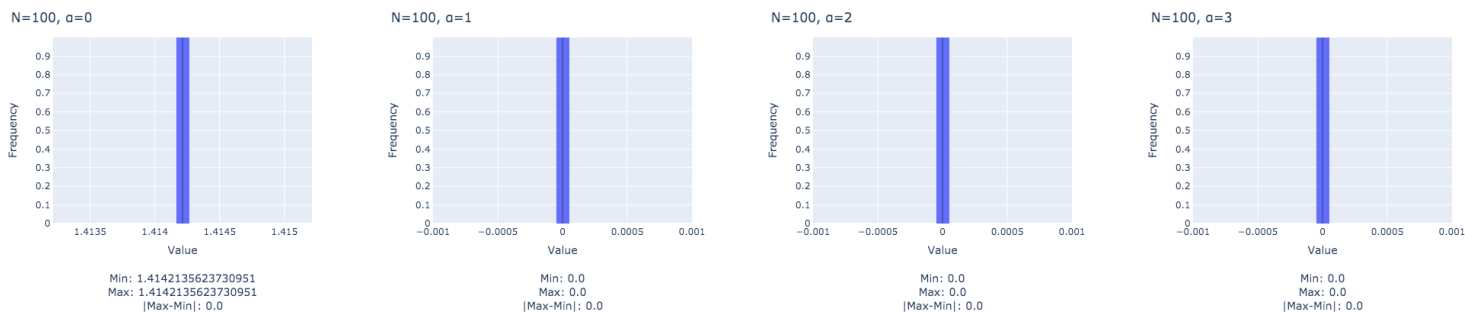


N=1000

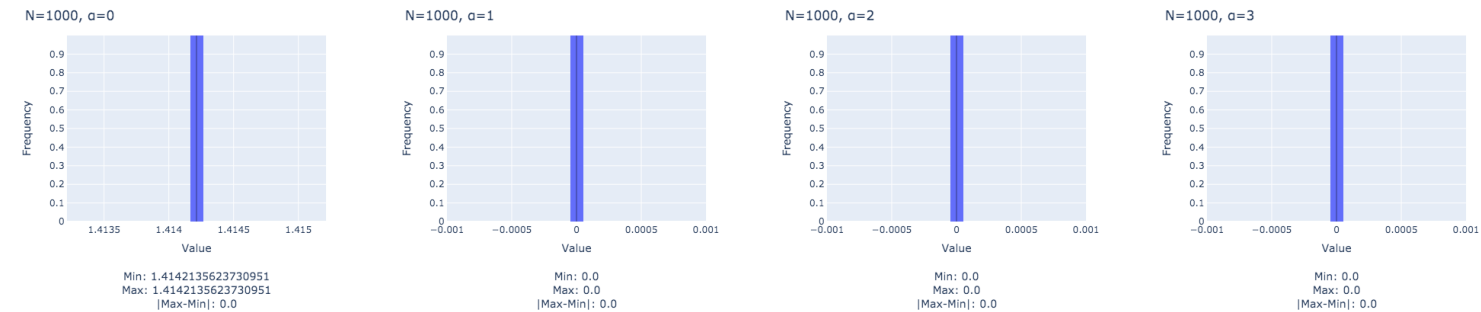


Case 2: ProjectedLinearEstimator(True)

N=100

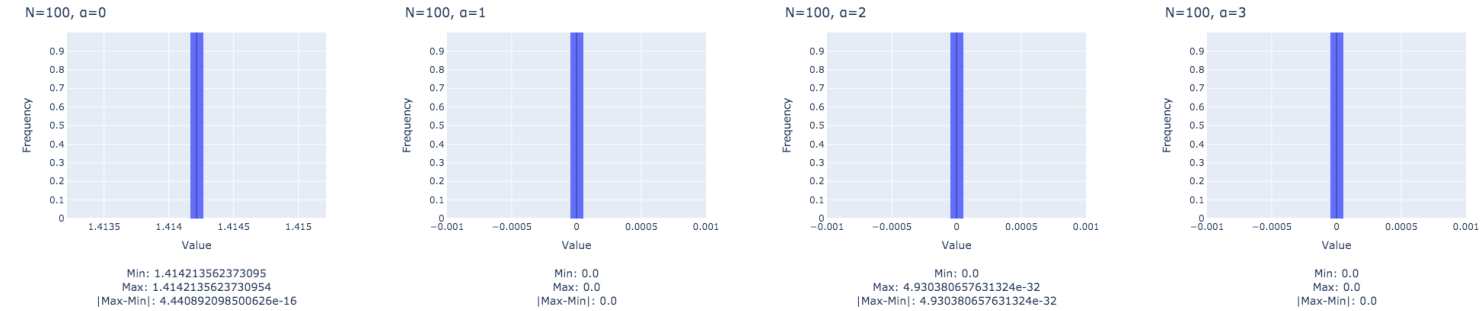


N=1000

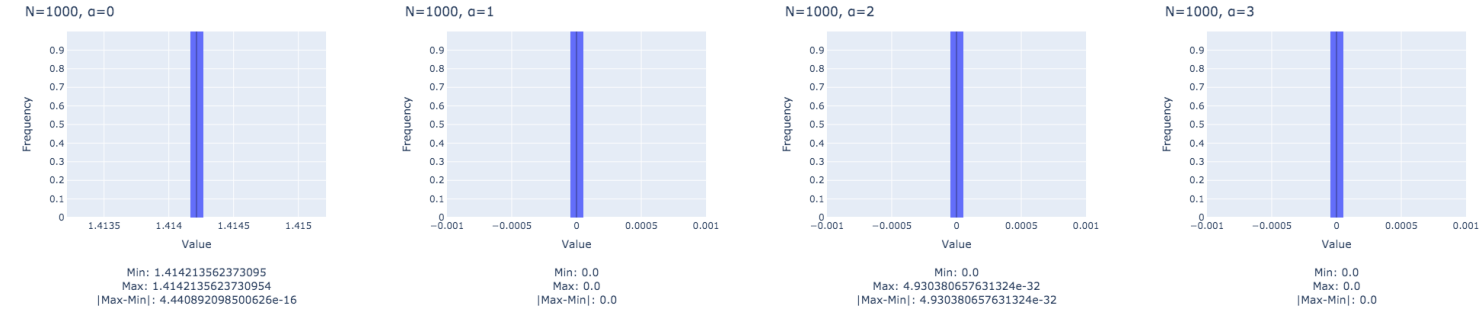


Case 3: ProjectedLinearEstimator(False)

N=100



N=1000



Test of inequality constraint violation

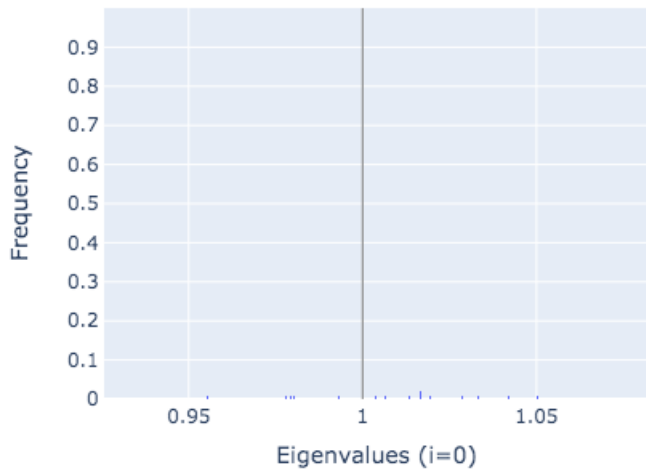
Eigenvalue

Case 0: LinearEstimator(True)

N=100

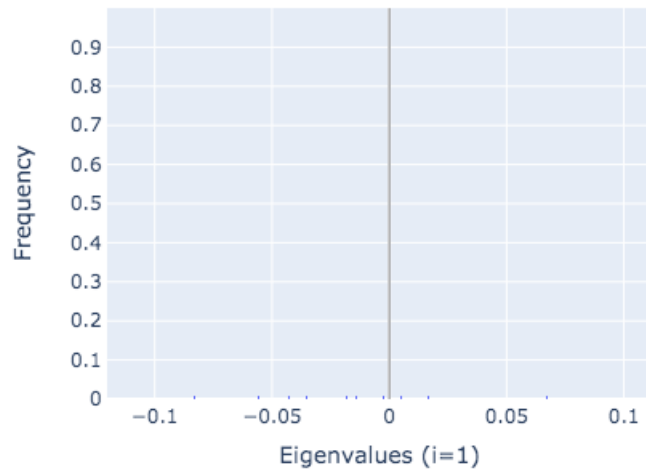
$x=0$

N=100, Nrep=100, x=0



Min: 0.9257901792008475
Max: 1.082268050859363
|Max-Min|: 0.15647787165851545

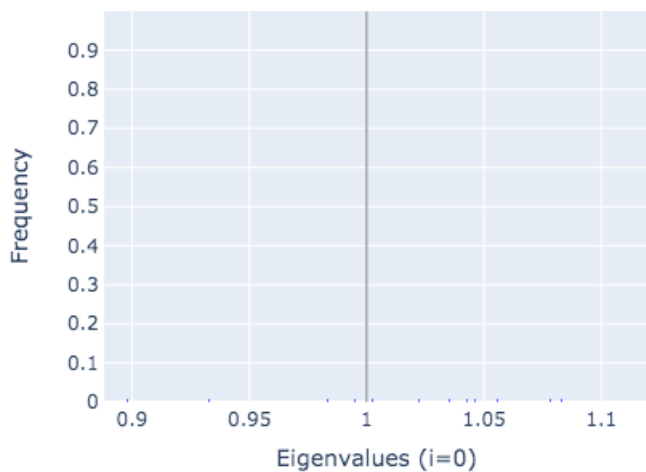
N=100, Nrep=100, x=0



Min: -0.12021363620476329
Max: 0.11186450742784633
|Max-Min|: 0.23207814363260962

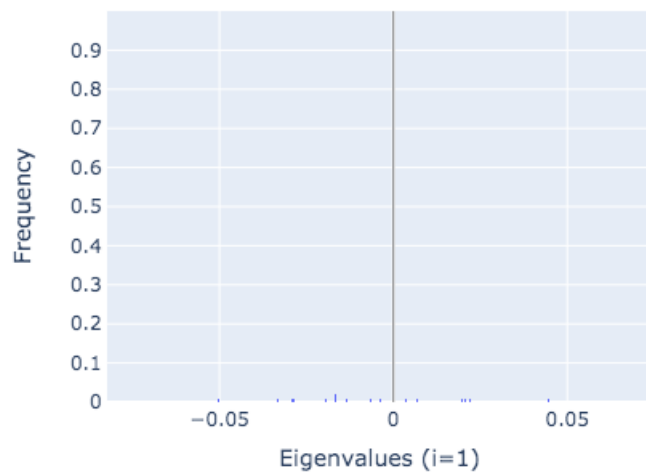
x=1

N=100, Nrep=100, x=1



Min: 0.8881354925721543
Max: 1.1202136362047632
|Max-Min|: 0.23207814363260892

N=100, Nrep=100, x=1

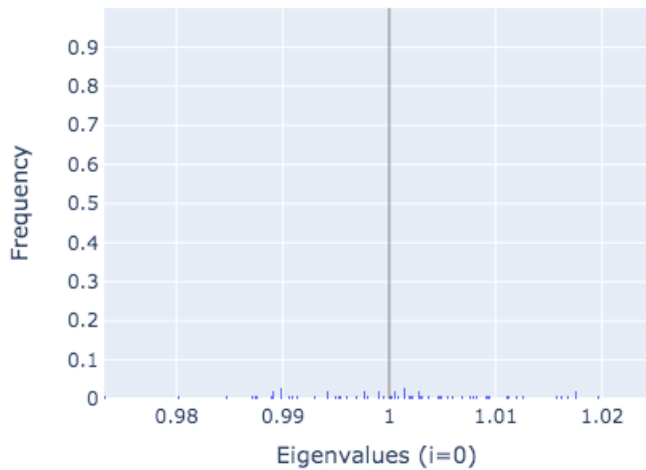


Min: -0.08226805085936303
Max: 0.07420982079915237
|Max-Min|: 0.1564778716585154

N=1000

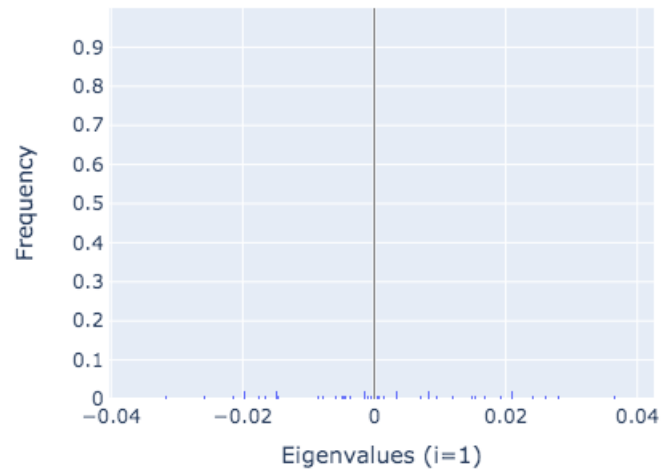
x=0

N=1000, Nrep=100, x=0



Min: 0.9732385155264016
Max: 1.0243733212476178
|Max-Min|: 0.0511348057212162

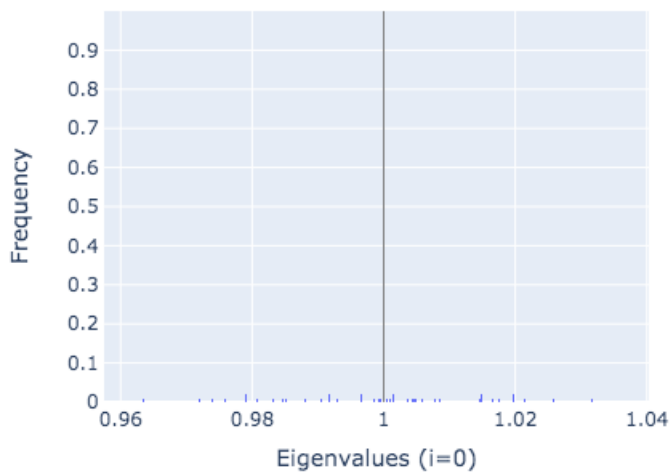
N=1000, Nrep=100, x=0



Min: -0.040294764421695356
Max: 0.04245490720818466
|Max-Min|: 0.08274967162988

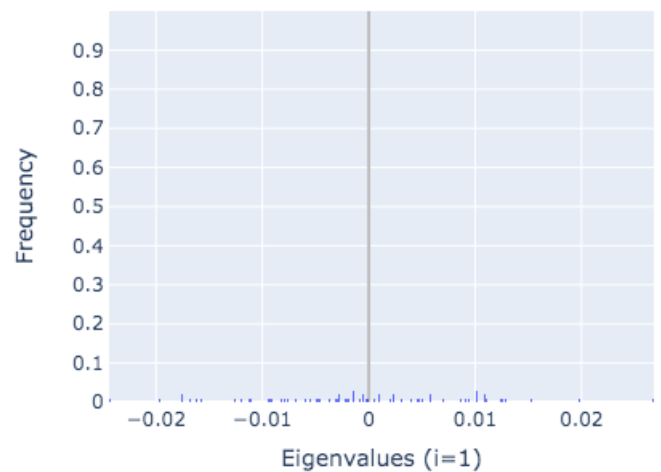
x=1

N=1000, Nrep=100, x=1



Min: 0.9575450927918151
Max: 1.0402947644216958
|Max-Min|: 0.08274967162988067

N=1000, Nrep=100, x=1



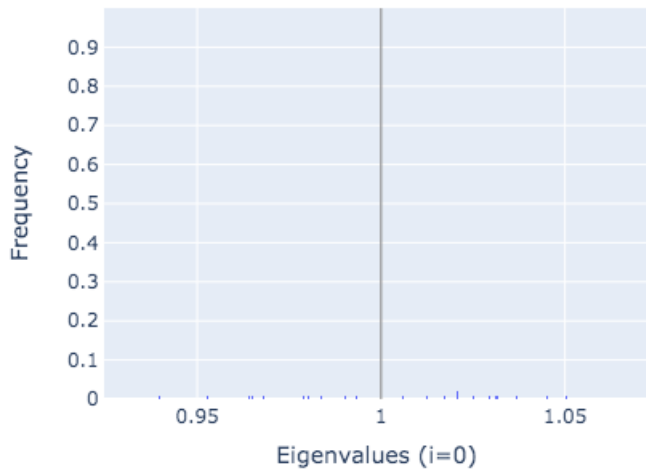
Min: -0.024373321247617666
Max: 0.02676148447359867
|Max-Min|: 0.051134805721216335

Case 1: LinearEstimator(False)

N=100

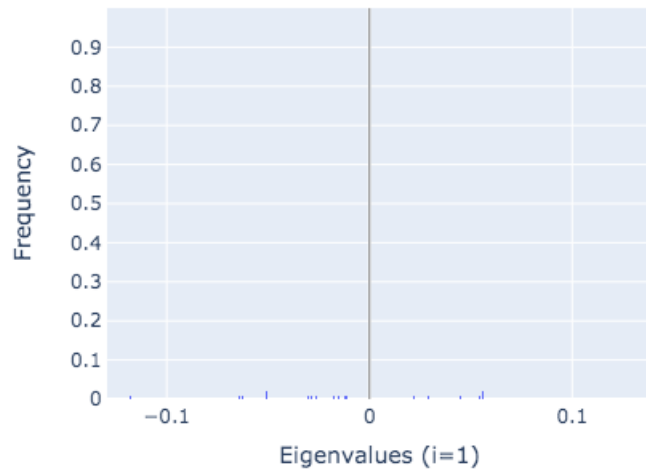
x=0

N=100, Nrep=100, x=0



Min: 0.9247221268969612
Max: 1.072781024904309
|Max-Min|: 0.14805889800734784

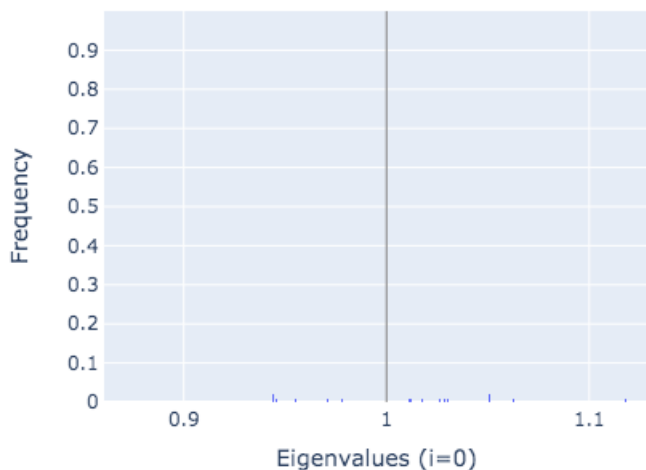
N=100, Nrep=100, x=0



Min: -0.12936941374872263
Max: 0.13921760499030264
|Max-Min|: 0.26858701873902524

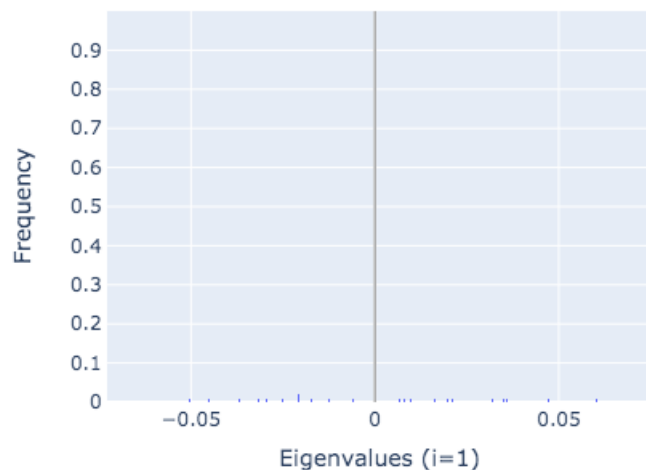
x=1

N=100, Nrep=100, x=1



Min: 0.8607823950096976
Max: 1.129369413748723
|Max-Min|: 0.26858701873902535

N=100, Nrep=100, x=1

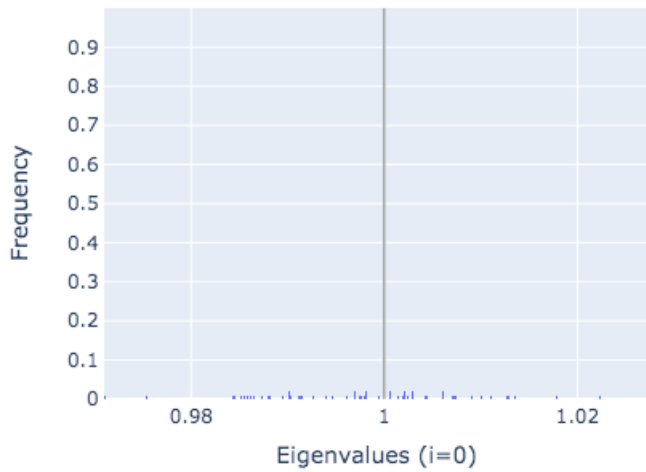


Min: -0.07278102490430943
Max: 0.07527787310303863
|Max-Min|: 0.14805889800734806

N=1000

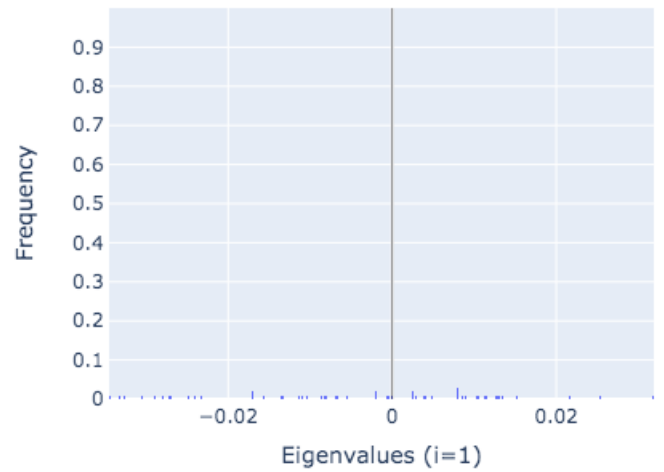
x=0

N=1000, Nrep=100, x=0



Min: 0.9710571691597577
Max: 1.027392604697151
|Max-Min|: 0.0563354355373934

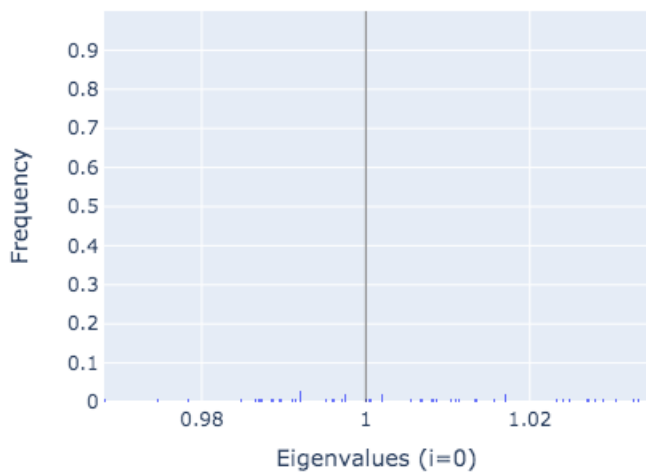
N=1000, Nrep=100, x=0



Min: -0.03443252409754023
Max: 0.03180128311428652
|Max-Min|: 0.06623380721182676

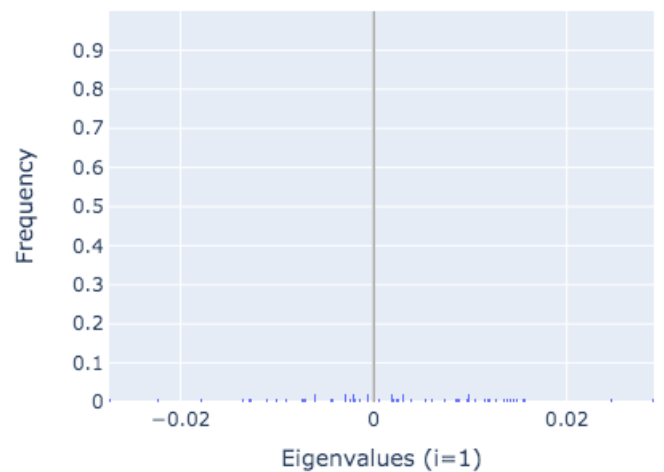
x=1

N=1000, Nrep=100, x=1



Min: 0.968198716885714
Max: 1.034432524097541
|Max-Min|: 0.06623380721182692

N=1000, Nrep=100, x=1



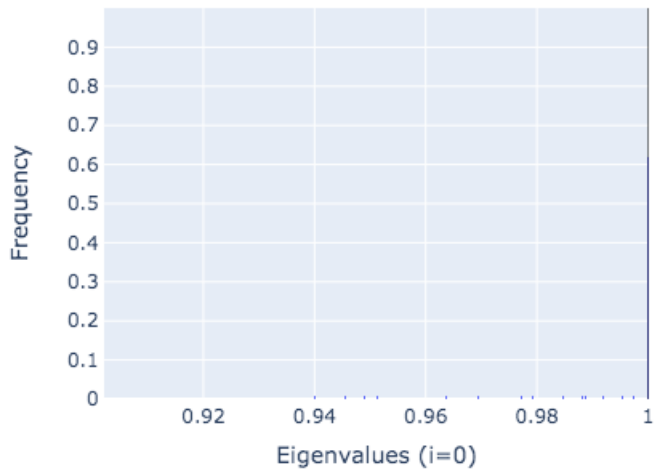
Min: -0.027392604697151532
Max: 0.02894283084024192
|Max-Min|: 0.05633543553739345

Case 2: ProjectedLinearEstimator(True)

N=100

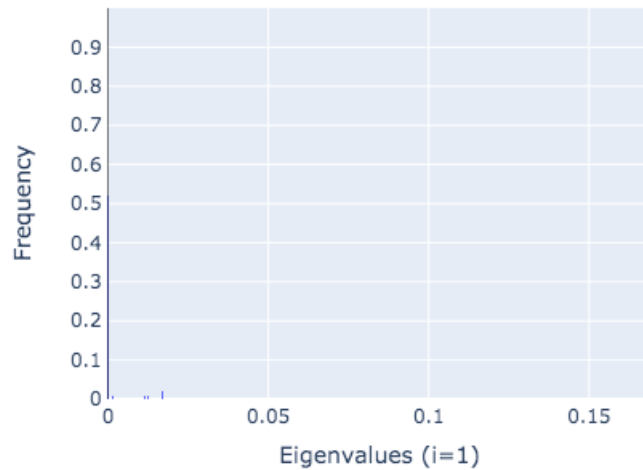
x=0

N=100, Nrep=100, x=0



Min: 0.9021892769104989
 Max: 1.0000000000011877
 |Max-Min|: 0.09781072309068883

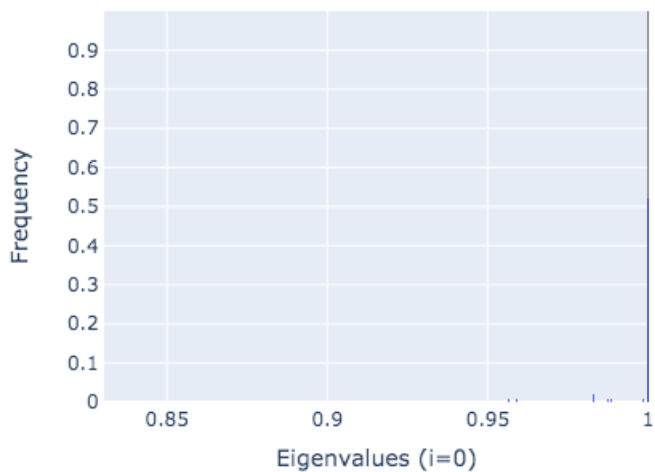
N=100, Nrep=100, x=0



Min: -1.2233634963658185e-12
 Max: 0.1695003121099834
 |Max-Min|: 0.16950031211120675

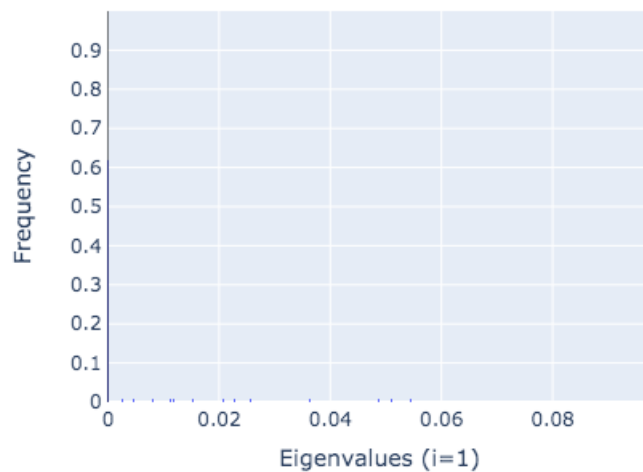
x=1

N=100, Nrep=100, x=1



Min: 0.8304996878900167
 Max: 1.0000000000012235
 |Max-Min|: 0.16950031211120675

N=100, Nrep=100, x=1

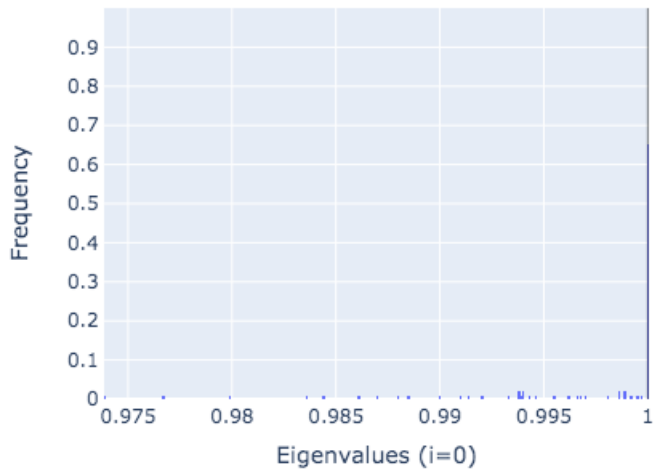


Min: -1.1872767391769761e-12
 Max: 0.09781072308950109
 |Max-Min|: 0.09781072309068836

N=1000

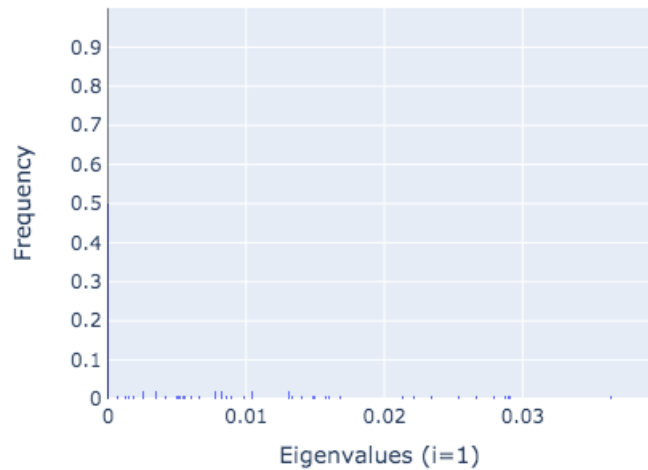
x=0

N=1000, Nrep=100, x=0



Min: 0.9739117566698812
 Max: 1.0000000000014155
 |Max-Min|: 0.026088243331534366

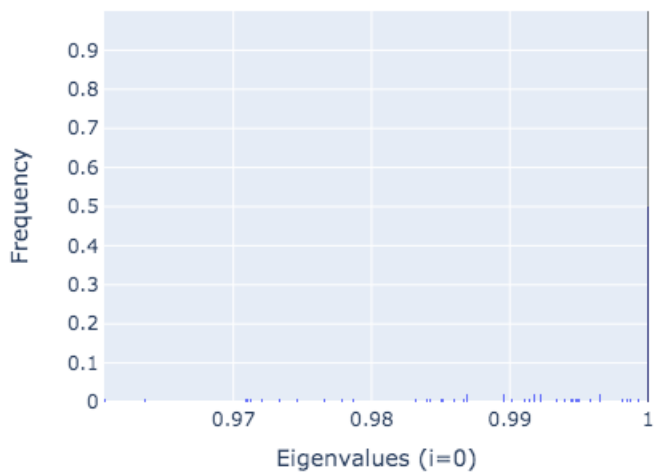
N=1000, Nrep=100, x=0



Min: -3.0426760104856927e-12
 Max: 0.03927406728451526
 |Max-Min|: 0.03927406728755794

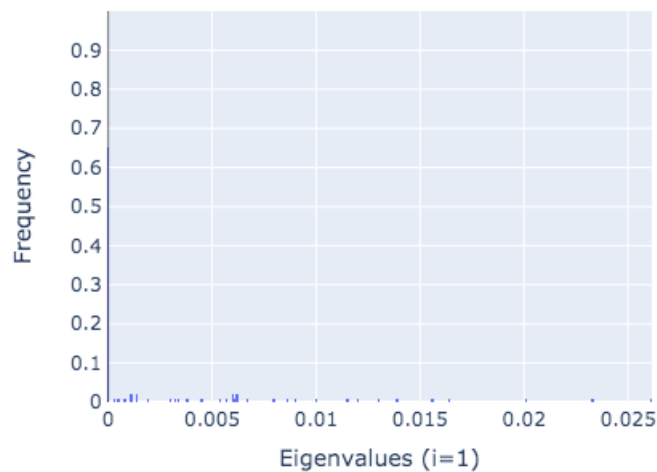
x=1

N=1000, Nrep=100, x=1



Min: 0.9607259327154845
 Max: 1.000000000003043
 |Max-Min|: 0.039274067287558445

N=1000, Nrep=100, x=1



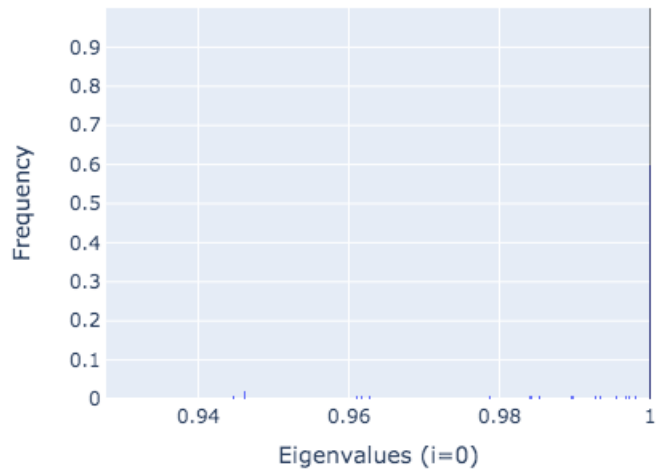
Min: -1.4151804435720682e-12
 Max: 0.026088243330118915
 |Max-Min|: 0.026088243331534096

Case 3: ProjectedLinearEstimator(False)

N=100

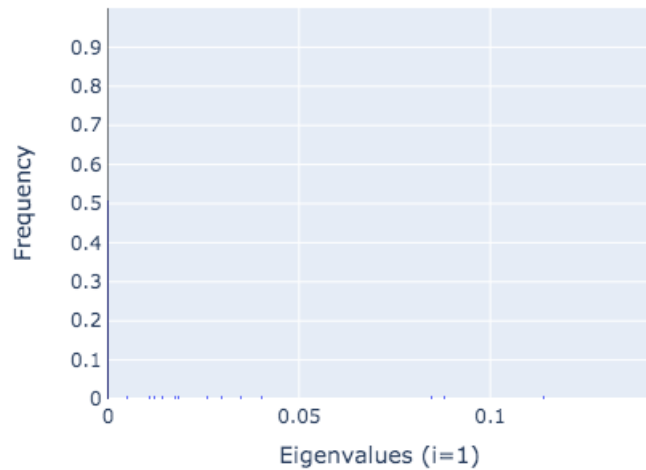
x=0

N=100, Nrep=100, x=0



Min: 0.9277785635698566
 Max: 1.0000000000038394
 |Max-Min|: 0.07222143643398282

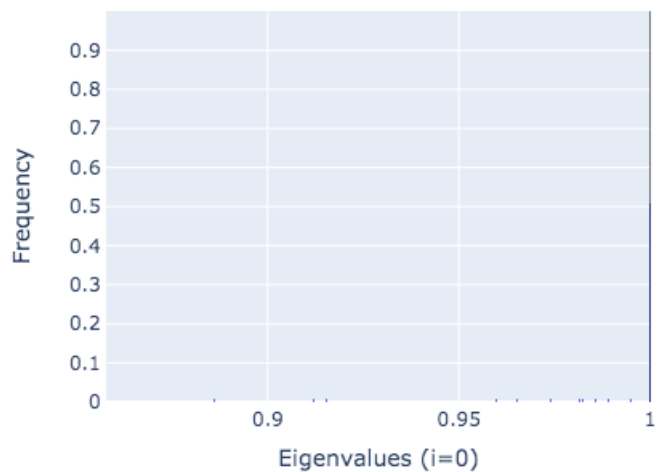
N=100, Nrep=100, x=0



Min: -1.0654910300727533e-12
 Max: 0.1422214364301432
 |Max-Min|: 0.1422214364312087

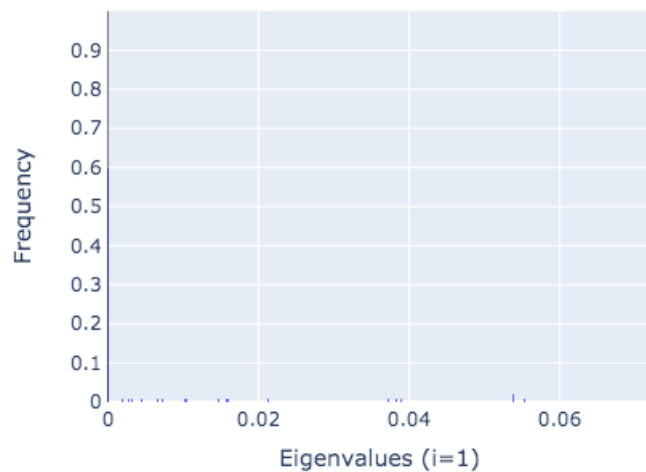
x=1

N=100, Nrep=100, x=1



Min: 0.8577785635698566
 Max: 1.0000000000010651
 |Max-Min|: 0.14222143643120855

N=100, Nrep=100, x=1

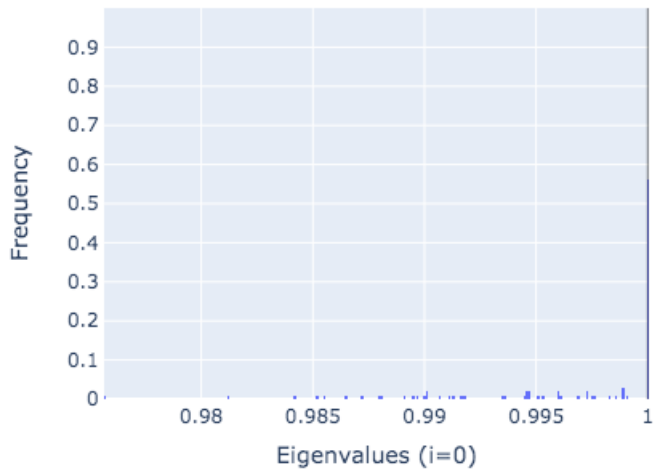


Min: -3.839436834123106e-12
 Max: 0.07222143643014312
 |Max-Min|: 0.07222143643398256

N=1000

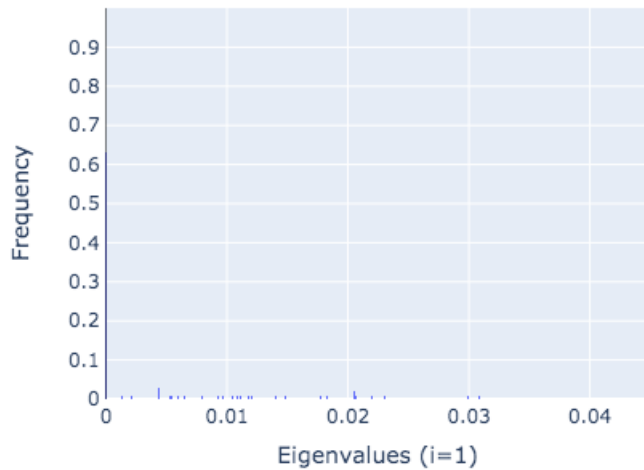
x=0

N=1000, Nrep=100, x=0



Min: 0.9757419830022858
Max: 1.000000000001021
|Max-Min|: 0.0242580169987352

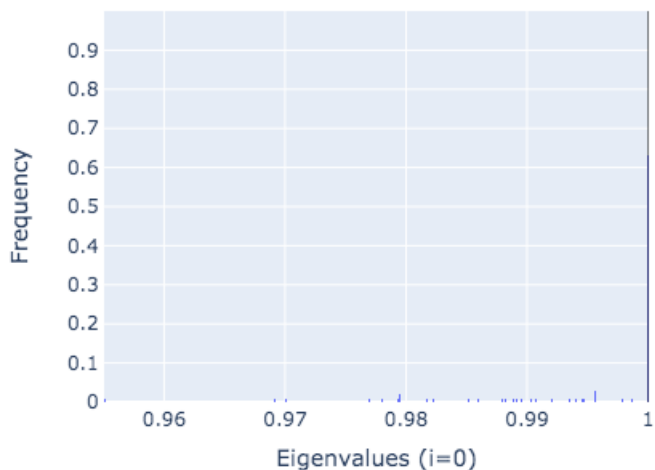
N=1000, Nrep=100, x=0



Min: -7.479982058185287e-12
Max: 0.04491905455255574
|Max-Min|: 0.04491905456003572

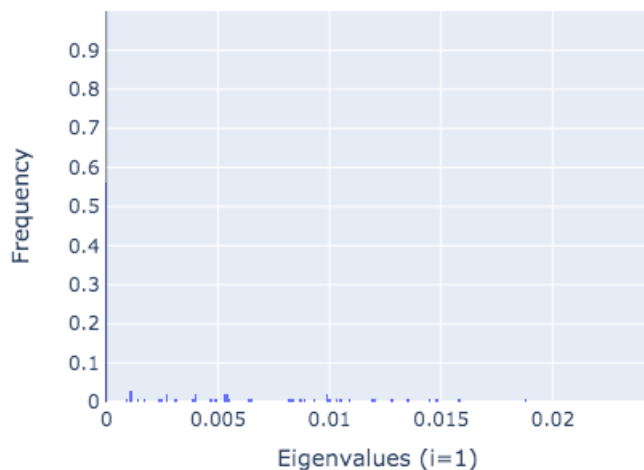
x=1

N=1000, Nrep=100, x=1



Min: 0.9550809454474437
Max: 1.000000000000748
|Max-Min|: 0.04491905456003631

N=1000, Nrep=100, x=1



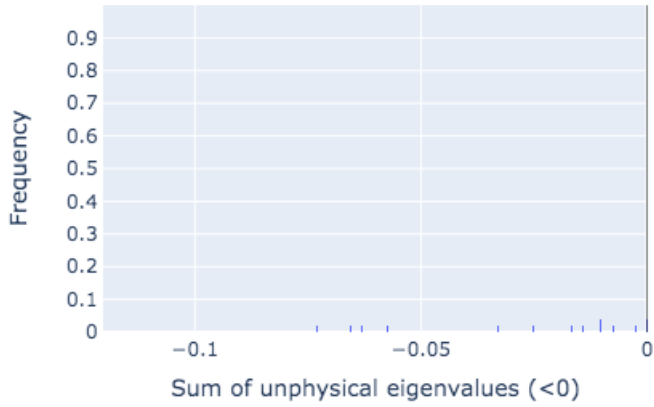
Min: -1.0215978158421267e-12
Max: 0.024258016997714273
|Max-Min|: 0.024258016998735872

Sum of unphysical eigenvalues

Case 0: LinearEstimator(True)

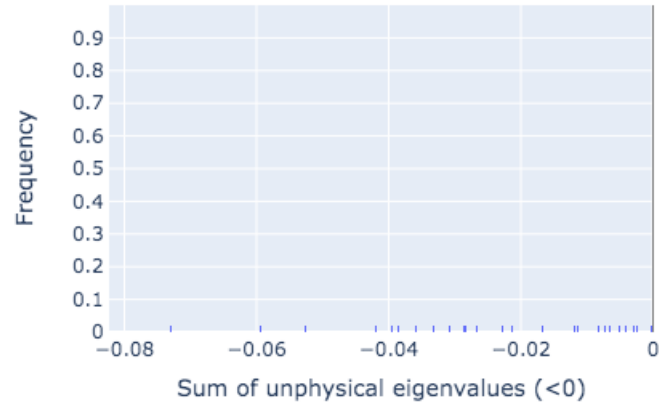
N=100

N=100, Nrep=100, x=0
Number of unphysical estimates=51



Min: -0.12021363620476329
Max: -4.7616888221801664e-05
|Max-Min|: 0.12016601931654149

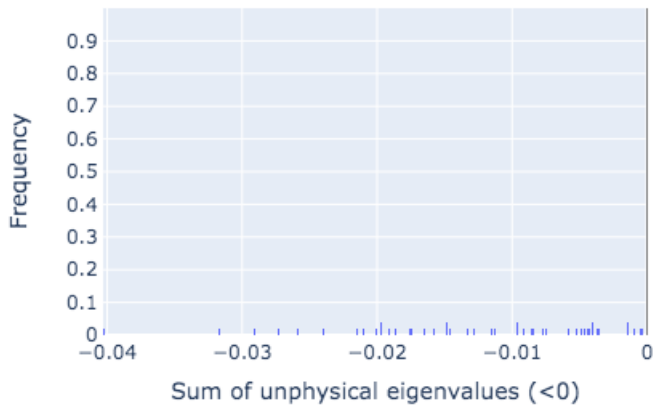
N=100, Nrep=100, x=1
Number of unphysical estimates=51



Min: -0.08226805085936303
Max: -0.0002474641203061018
|Max-Min|: 0.08202058673905693

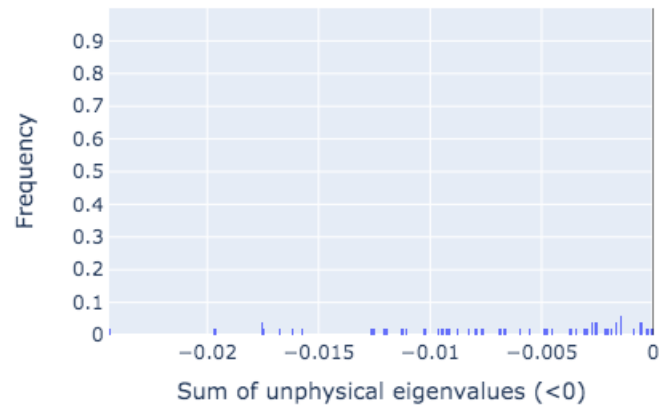
N=1000

N=1000, Nrep=100, x=0
Number of unphysical estimates=51



Min: -0.040294764421695356
Max: -0.0003255451106030759
|Max-Min|: 0.03996921931109228

N=1000, Nrep=100, x=1
Number of unphysical estimates=52

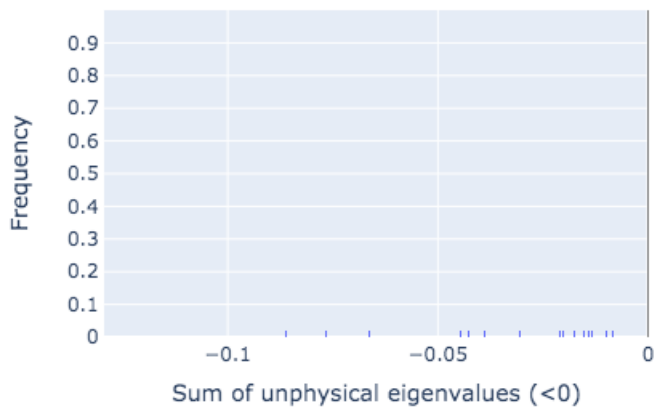


Min: -0.024373321247617666
Max: -6.578509344273067e-05
|Max-Min|: 0.024307536154174934

Case 1: LinearEstimator(False)

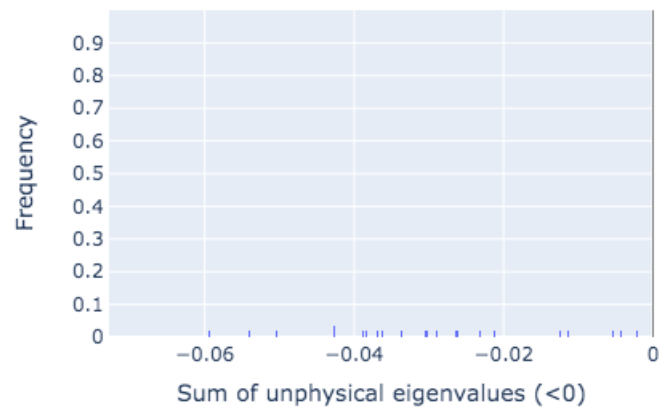
N=100

N=100, Nrep=100, x=0
Number of unphysical estimates=50



Min: -0.12936941374872263
Max: -0.005166640220035144
|Max-Min|: 0.12420277352868749

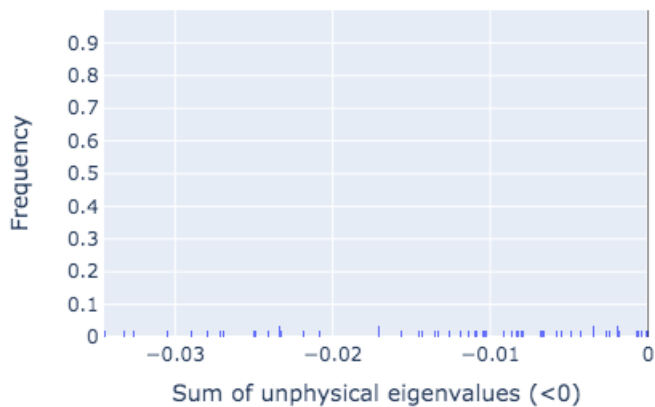
N=100, Nrep=100, x=1
Number of unphysical estimates=56



Min: -0.07278102490430943
Max: -0.0021385017241675247
|Max-Min|: 0.07064252318014191

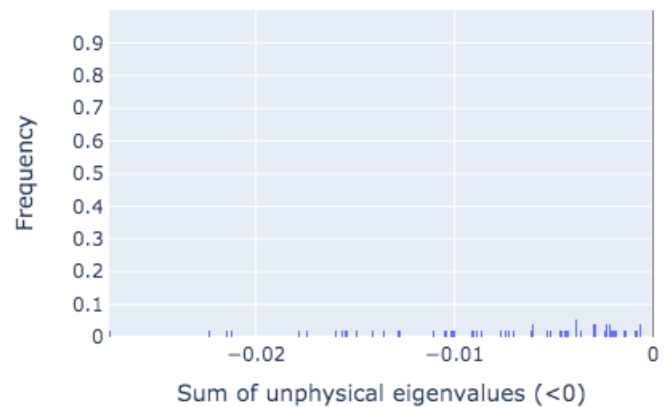
N=1000

N=1000, Nrep=100, x=0
Number of unphysical estimates=57



Min: -0.03443252409754023
Max: -5.2628775518215596e-05
|Max-Min|: 0.034379895322022014

N=1000, Nrep=100, x=1
Number of unphysical estimates=54

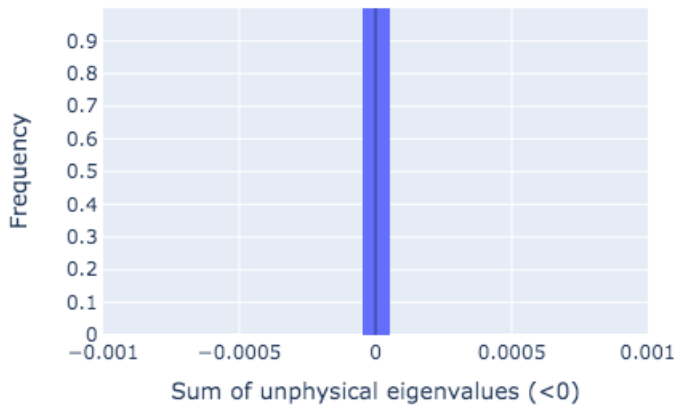


Min: -0.027392604697151532
Max: -0.0006357810958233633
|Max-Min|: 0.026756823601328167

Case 2: ProjectedLinearEstimator(True)

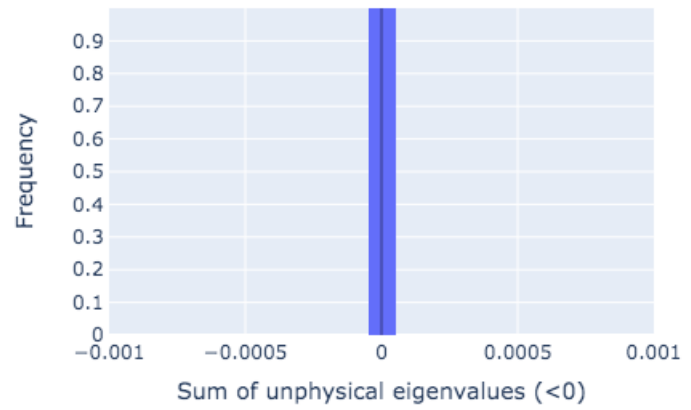
N=100

N=100, Nrep=100, x=0
Number of unphysical estimates=5



Min: -1.2233634963658185e-12
Max: -1.4706239672689257e-13
|Max-Min|: 1.076301099638926e-12

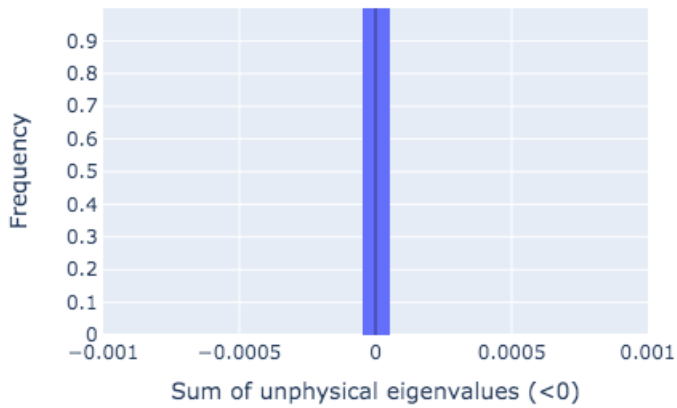
N=100, Nrep=100, x=1
Number of unphysical estimates=11



Min: -1.1872767391769761e-12
Max: -1.0458293777914498e-13
|Max-Min|: 1.0826938013978311e-12

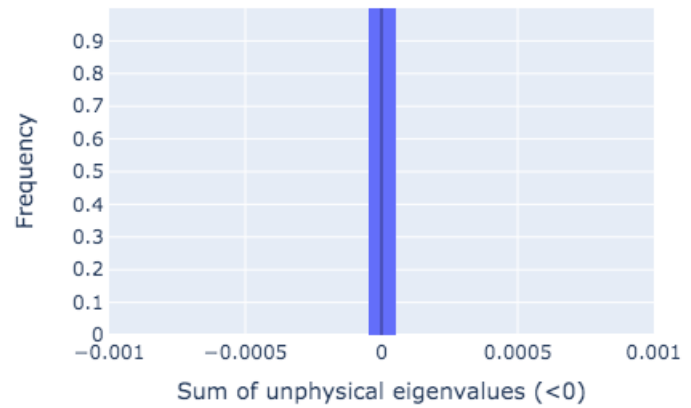
N=1000

N=1000, Nrep=100, x=0
Number of unphysical estimates=13



Min: -3.0426760104856927e-12
Max: -1.0186890604075322e-13
|Max-Min|: 2.9408071044449396e-12

N=1000, Nrep=100, x=1
Number of unphysical estimates=23

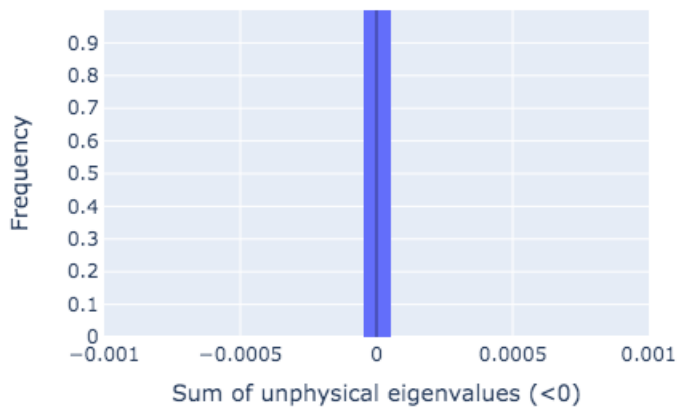


Min: -1.4151804435720682e-12
Max: -1.2119904469353967e-13
|Max-Min|: 1.2939813988785286e-12

Case 3: ProjectedLinearEstimator(False)

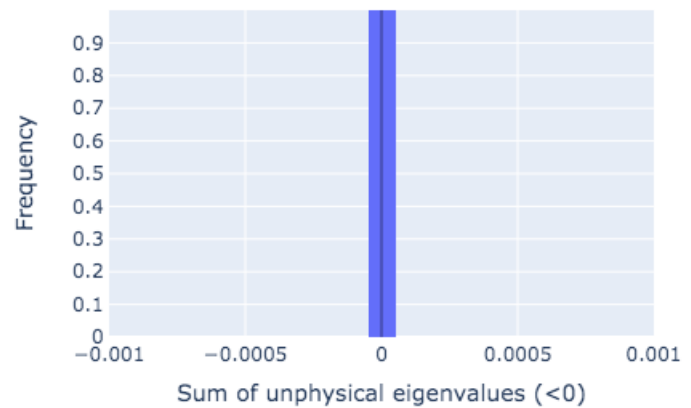
N=100

N=100, Nrep=100, x=0
Number of unphysical estimates=9



Min: -1.0654910300727533e-12
Max: -1.0722277384212943e-13
|Max-Min|: 9.582682562306238e-13

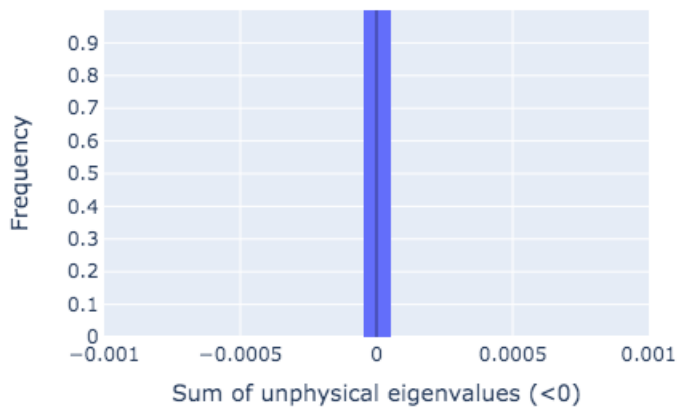
N=100, Nrep=100, x=1
Number of unphysical estimates=12



Min: -3.839436834123106e-12
Max: -1.0892898833394103e-13
|Max-Min|: 3.730507845789165e-12

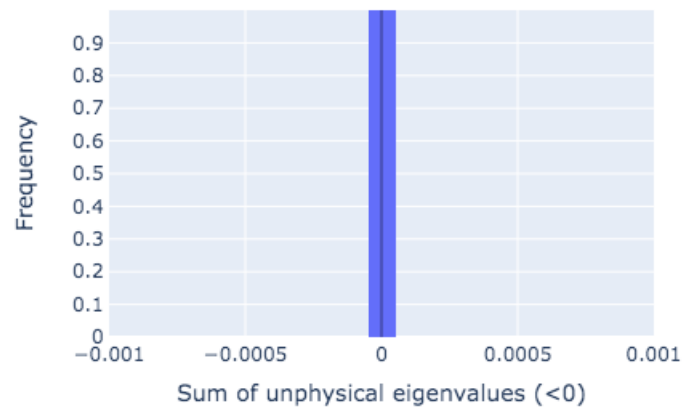
N=1000

N=1000, Nrep=100, x=0
Number of unphysical estimates=19



Min: -7.479982058185287e-12
Max: -1.3202879171016676e-13
|Max-Min|: 7.34795326647512e-12

N=1000, Nrep=100, x=1
Number of unphysical estimates=14



Min: -1.0215978158421267e-12
Max: -1.0778494408925333e-13
|Max-Min|: 9.138128717528734e-13