Analysis_Out

March 9, 2022

[1]:
```
import warnings
warnings.filterwarnings('ignore')
```

[2]:
```
import scrapbook as sb
import pandas as pd
import numpy as np
import seaborn as sns
import numpy as np
from statistics import mean
import matplotlib.pyplot as plt
```

1 Baseline

[3]:
```
books = sb.read_notebooks("./BaseLine_Model_Output")
baseLine_data = []
for nb in books.notebooks:
    nbList=[nb.scraps['Stats Model MAE'].data,nb.scraps['Catboost MAE'].data]
    baseLine_data.append(nbList)
df = pd.DataFrame(baseLine_data, columns = ["Stats Model","Catboost"])
#baseLine_data = np.reshape(baseLine_data,(2,10))
display(df)
print(df.mean())
```

	Stats Model	Catboost
0	0.394439	0.156707
1	0.368530	0.130645
2	0.353290	0.073173
3	0.497611	0.146667
4	0.456710	0.141902
5	0.362967	0.089064
6	0.372887	0.325105
7	0.323525	0.079777
8	0.358416	0.146612
9	0.569174	0.225214

```
Stats Model    0.405755
Catboost       0.151487
dtype: float64
```

2 GAN Model

[4]:
```
book = sb.read_notebooks("./GAN_Output")
gan_data = []
gan_mse = []
for nb in book.notebooks:
    metrics = nb.scraps['GAN_1 Metrics'].data
    for i in range(1000):
        gan_mse.append(metrics[0][i])
    nbList = [nb.scraps['GAN Model MSE'].data,
              nb.scraps['GAN Model MAE'].data,
              nb.scraps['GAN Model Euclidean distance'].data,
              nb.scraps['GAN Model Manhattan Distance'].data]
    gan_data.append(nbList)

df = pd.DataFrame(gan_data, columns = ['MSE','MAE','Euclidean␣
↪Distance','Manhattan Distance'])
display(df.style)
print("MEAN:")
print(df.mean(axis = 0))
gan_data = np.array(gan_data)
```

```
<pandas.io.formats.style.Styler at 0x7f99e258bb80>
```

```
MEAN:
MSE                    0.090416
MAE                    0.197483
Euclidean Distance     1.297779
Manhattan Distance     3.949660
dtype: float64
```

3 ABC_GAN Analysis

3.1 ABC Pre-generator - Catboost

[5]:
```
book = sb.read_notebooks("./ABC_GAN_Catboost")
paramVal = [[1,1],[0.1,1],[0.01,1],[1,0.1],[0.1,0.1],[0.01,0.1],[1,0.01],[0.1,0.
↪01],[0.01,0.01]]
abc_mae = [[] for i in range(9)]
abc_mae_skip = [[] for i in range(9)]
abc_mae_mean = [[] for i in range(9)]
abc_mae_skip_mean = [[] for i in range(9)]
abc_weights = [[] for i in range(9)]
prior_model = [[] for i in range(9)]
abc_pre_generator = [[] for i in range(9)]

for nb in book.notebooks:
    metrics1 = np.array(nb.scraps['ABC_GAN_1 Metrics'].data)
```

```
    metrics3 = np.array(nb.scraps['ABC_GAN_3 Metrics'].data)
    paramVar = float(nb.papermill_dataframe.iloc[0]['value'])
    paramBias = float(nb.papermill_dataframe.iloc[1]['value'])
    #Divide data according to parameters
    for i in range(9):
        if paramVar == paramVal[i][0] and paramBias == paramVal[i][1]:
            for j in range(100):
                abc_mae[i].append(metrics1[1,j])
                abc_mae_skip[i].append(metrics3[1,j])
            abc_weights[i].append(nb.scraps['Skip Connection Weight'].data)
            prior_model[i].append(nb.scraps['Prior Model MSE'].data)
            abc_pre_generator[i].append(nb.scraps['ABC Pre-generator MSE'].data)
            abc_mae_skip_mean[i].append(mean(metrics3[1,:]))
            abc_mae_mean[i].append(mean(metrics1[1,:]))
```

[6]:
```
for i in range(9):
    data = []
    for j in range(len(abc_weights[i])):
        data.append([paramVal[i][0], paramVal[i][1],prior_model[i][j],
                     ␣
 ↪abc_pre_generator[i][j],abc_weights[i][j],abc_mae_mean[i][j],abc_mae_skip_mean[i][j]])

    df = pd.DataFrame(data, columns = ['Variance','Bias','Prior Model MAE',
                                       'ABC pre-generator MAE','Skip Node␣
 ↪weight','ABC GAN MAE','ABC_GAN MAE (skip connection)'])
    display(df.round(5))
    print(df.mean(axis=0))
    print("----------------------------------------------------------------")
```

	Variance	Bias	Prior Model MAE	ABC pre-generator MAE	Skip Node weight	\
0	1	1	0.33940	1.23536	0.94826	
1	1	1	0.33737	1.37975	0.61124	
2	1	1	0.30833	1.32396	0.14149	
3	1	1	0.24887	1.30517	0.73428	
4	1	1	0.35931	1.69546	0.11051	
5	1	1	0.27828	1.06569	0.17545	
6	1	1	0.30177	1.24321	0.13008	
7	1	1	0.24163	0.89242	0.12000	
8	1	1	0.28360	1.11022	0.19241	
9	1	1	0.23384	0.92098	0.19288	

	ABC GAN MAE	ABC_GAN MAE (skip connection)
0	0.11357	0.17955
1	0.17546	0.22571
2	0.26229	0.20108
3	0.15933	0.12770
4	0.21945	0.25125
5	0.19590	0.17233

```
6      0.18765                        0.16587
7      0.14820                        0.14466
8      0.17033                        0.15950
9      0.17871                        0.16900

Variance                          1.000000
Bias                              1.000000
Prior Model MAE                   0.293239
ABC pre-generator MAE             1.217222
Skip Node weight                  0.335661
ABC GAN MAE                       0.181088
ABC_GAN MAE (skip connection)     0.179665
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0       0.1     1          0.34522                0.91613           0.86654
1       0.1     1          0.42982                0.54821           0.20623
2       0.1     1          0.37364                0.89897           0.45629
3       0.1     1          0.30149                0.89776           0.11980
4       0.1     1          0.32270                1.03394           0.10645
5       0.1     1          0.43163                1.06819           0.19981
6       0.1     1          0.27770                0.85109           0.23155
7       0.1     1          0.29862                0.62391           0.20230
8       0.1     1          0.28327                1.06640           0.62501
9       0.1     1          0.44805                1.03807           0.80594

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.26365                        0.20268
1      0.21470                        0.18884
2      0.23385                        0.18193
3      0.14368                        0.11256
4      0.26111                        0.18188
5      0.20641                        0.14709
6      0.19811                        0.18025
7      0.21804                        0.15272
8      0.20653                        0.20672
9      0.22724                        0.17899

Variance                          0.100000
Bias                              1.000000
Prior Model MAE                   0.351214
ABC pre-generator MAE             0.894265
Skip Node weight                  0.381993
ABC GAN MAE                       0.217332
ABC_GAN MAE (skip connection)     0.173366
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
```

How is w close to 0 ?

```
0      0.01     1          0.25246               0.84264          0.13170
1      0.01     1          0.26360               0.61303          0.84795
2      0.01     1          0.32241               0.75332          0.13259
3      0.01     1          0.40234               0.85302          0.19845
4      0.01     1          0.23324               0.74013          0.12878
5      0.01     1          0.38712               0.62617          0.77245
6      0.01     1          0.37999               0.67656          0.11361
7      0.01     1          0.26258               0.65570          0.15128
8      0.01     1          0.34960               0.80329          0.12742
9      0.01     1          0.33424               0.84481          0.63255

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.13808                        0.11835
1      0.12200                        0.13767
2      0.19736                        0.18479
3      0.24229                        0.17864
4      0.14509                        0.15236
5      0.13587                        0.17123
6      0.26438                        0.17171
7      0.20190                        0.15850
8      0.19761                        0.21005
9      0.13561                        0.15046

Variance                         0.010000
Bias                             1.000000
Prior Model MAE                  0.318759
ABC pre-generator MAE            0.740866
Skip Node weight                 0.323679
ABC GAN MAE                      0.178020
ABC_GAN MAE (skip connection)    0.163377
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0         1   0.1          0.43561                0.74859           0.35479
1         1   0.1          0.28184                0.99126           0.08113
2         1   0.1          0.19014                1.05491           0.07380
3         1   0.1          0.26453                1.07082           0.08049
4         1   0.1          0.24599                1.07991           0.07133
5         1   0.1          0.33888                1.02142           0.08047
6         1   0.1          0.40806                1.06797           0.81499
7         1   0.1          0.32971                1.07045           0.07399
8         1   0.1          0.28961                0.98322           0.29144
9         1   0.1          0.52755                1.14063           0.47393

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.22145                        0.29530
1      0.20912                        0.26460
2      0.15305                        0.16566
```

```
3      0.20056                        0.20810
4      0.22864                        0.22342
5      0.28885                        0.31943
6      0.22694                        0.31548
7      0.26911                        0.33766
8      0.24735                        0.24618
9      0.39080                        0.47710

Variance                          1.000000
Bias                              0.100000
Prior Model MAE                   0.331192
ABC pre-generator MAE             1.022918
Skip Node weight                  0.239637
ABC GAN MAE                       0.243585
ABC_GAN MAE (skip connection)     0.285294
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0       0.1   0.1          0.43950                0.46254           0.52780
1       0.1   0.1          0.27478                0.26016           0.04903
2       0.1   0.1          0.33685                0.38292           0.80767
3       0.1   0.1          0.25214                0.31656           0.10125
4       0.1   0.1          0.33587                0.35658           0.66519
5       0.1   0.1          0.26255                0.30937           0.06615
6       0.1   0.1          0.60386                0.61524           0.06667
7       0.1   0.1          0.28395                0.34426           0.08852
8       0.1   0.1          0.24195                0.24939           0.08934
9       0.1   0.1          0.38222                0.32636           0.74403

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.38173                        0.37531
1      0.18777                        0.21756
2      0.26388                        0.24969
3      0.19014                        0.21465
4      0.26158                        0.20687
5      0.21574                        0.21770
6      0.51544                        0.44774
7      0.26835                        0.21137
8      0.16007                        0.20482
9      0.34925                        0.32487

Variance                          0.100000
Bias                              0.100000
Prior Model MAE                   0.341367
ABC pre-generator MAE             0.362338
Skip Node weight                  0.320566
ABC GAN MAE                       0.279394
ABC_GAN MAE (skip connection)     0.267057
```

```
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0      0.01   0.1          0.30430                0.30129           0.15095
1      0.01   0.1          0.39774                0.38213           0.13709
2      0.01   0.1          0.28413                0.26740           0.41843
3      0.01   0.1          0.36408                0.39441           0.17876
4      0.01   0.1          0.23620                0.27116           0.47520
5      0.01   0.1          0.23179                0.25252           0.66364
6      0.01   0.1          0.27544                0.28041           0.10142
7      0.01   0.1          0.28580                0.35268           0.72014
8      0.01   0.1          0.25405                0.26982           0.17634
9      0.01   0.1          0.33591                0.34922           0.75330

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.23484                        0.29508
1      0.27188                        0.35350
2      0.25492                        0.24405
3      0.29581                        0.33370
4      0.21088                        0.18163
5      0.23508                        0.20055
6      0.28224                        0.25594
7      0.21666                        0.24109
8      0.18361                        0.18345
9      0.26488                        0.23432

Variance                         0.010000
Bias                             0.100000
Prior Model MAE                  0.296944
ABC pre-generator MAE            0.312103
Skip Node weight                 0.377527
ABC GAN MAE                      0.245081
ABC_GAN MAE (skip connection)    0.252330
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0         1  0.01          0.27758                1.18640           0.07398
1         1  0.01          0.46227                0.89042           0.06550
2         1  0.01          0.32098                0.97452           0.07880
3         1  0.01          0.35196                1.09613           0.79278
4         1  0.01          0.27458                0.92471           0.12406
5         1  0.01          0.24247                1.13035           0.19510
6         1  0.01          0.37039                1.04197           0.07143
7         1  0.01          0.37543                0.79576           0.34068
8         1  0.01          0.33676                1.04347           0.06413
9         1  0.01          0.22450                1.07060           0.06762
```

```
   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.21384                        0.25977
1      0.49664                        0.47271
2      0.25224                        0.33090
3      0.31431                        0.31587
4      0.21252                        0.26446
5      0.21490                        0.26332
6      0.32317                        0.35455
7      0.35818                        0.34678
8      0.29465                        0.32400
9      0.16308                        0.19894

Variance                          1.000000
Bias                              0.010000
Prior Model MAE                   0.323692
ABC pre-generator MAE             1.015432
Skip Node weight                  0.187408
ABC GAN MAE                       0.284354
ABC_GAN MAE (skip connection)     0.313129
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0       0.1  0.01          0.33745                0.34370           0.02917
1       0.1  0.01          0.24996                0.29032           0.03959
2       0.1  0.01          0.31676                0.35565           0.23461
3       0.1  0.01          0.27503                0.26694           0.01949
4       0.1  0.01          0.28844                0.31127           0.37802
5       0.1  0.01          0.34123                0.36295           0.04284
6       0.1  0.01          0.36247                0.35394           0.57680
7       0.1  0.01          0.39652                0.43883           0.03971
8       0.1  0.01          0.38956                0.40877           0.03805
9       0.1  0.01          0.33376                0.34394           0.04291

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.29314                        0.33796
1      0.21448                        0.24310
2      0.23542                        0.32889
3      0.21190                        0.26835
4      0.24617                        0.28877
5      0.33728                        0.33237
6      0.34596                        0.33463
7      0.32287                        0.36958
8      0.34555                        0.38855
9      0.29818                        0.32839

Variance                          0.100000
Bias                              0.010000
Prior Model MAE                   0.329118
```

```
ABC pre-generator MAE            0.347632
Skip Node weight                 0.144117
ABC GAN MAE                      0.285096
ABC_GAN MAE (skip connection)    0.322059
dtype: float64
------------------------------------------------------------
```

	Variance	Bias	Prior Model MAE	ABC pre-generator MAE	Skip Node weight	\
0	0.01	0.01	0.27262	0.27318	0.02091	
1	0.01	0.01	0.32522	0.32539	0.09307	
2	0.01	0.01	0.23807	0.23956	0.03329	
3	0.01	0.01	0.26071	0.25984	0.00000	
4	0.01	0.01	0.36726	0.36846	0.01966	
5	0.01	0.01	0.42144	0.42595	0.24959	
6	0.01	0.01	0.25616	0.25749	0.01207	
7	0.01	0.01	0.45660	0.45366	0.16975	
8	0.01	0.01	0.48094	0.47900	0.00000	
9	0.01	0.01	0.27894	0.27478	0.17984	

	ABC GAN MAE	ABC_GAN MAE (skip connection)
0	0.25381	0.26873
1	0.27625	0.32448
2	0.23518	0.23842
3	0.27751	0.25573
4	0.34628	0.36449
5	0.37507	0.40614
6	0.24578	0.25556
7	0.43720	0.46657
8	0.42872	0.47976
9	0.23169	0.27350

```
Variance                         0.010000
Bias                             0.010000
Prior Model MAE                  0.335796
ABC pre-generator MAE            0.335731
Skip Node weight                 0.077817
ABC GAN MAE                      0.310750
ABC_GAN MAE (skip connection)    0.333336
dtype: float64
------------------------------------------------------------
```

3.2 ABC Pre-generator - Stats

[7]:
```
book = sb.read_notebooks("./ABC_GAN_Stats")
paramVal = [[1,1],[0.1,1],[0.01,1],[1,0.1],[0.1,0.1],[0.01,0.1],[1,0.01],[0.1,0.
↪01],[0.01,0.01]]
abc_mae = [[] for i in range(9)]
abc_mae_skip = [[] for i in range(9)]
```

```
abc_mae_mean = [[] for i in range(9)]
abc_mae_skip_mean = [[] for i in range(9)]
abc_weights = [[] for i in range(9)]
prior_model = [[] for i in range(9)]
abc_pre_generator = [[] for i in range(9)]

for nb in book.notebooks:
    metrics1 = np.array(nb.scraps['ABC_GAN_1 Metrics'].data)
    metrics3 = np.array(nb.scraps['ABC_GAN_3 Metrics'].data)
    paramVar = float(nb.papermill_dataframe.iloc[0]['value'])
    paramBias = float(nb.papermill_dataframe.iloc[1]['value'])
    #Divide data according to parameters
    for i in range(9):
        if paramVar == paramVal[i][0] and paramBias == paramVal[i][1]:
            for j in range(100):
                abc_mae[i].append(metrics1[1,j])
                abc_mae_skip[i].append(metrics3[1,j])
            abc_weights[i].append(nb.scraps['Skip Connection Weight'].data)
            prior_model[i].append(nb.scraps['Prior Model MSE'].data)
            abc_pre_generator[i].append(nb.scraps['ABC Pre-generator MSE'].data)
            abc_mae_skip_mean[i].append(mean(metrics3[1,:]))
            abc_mae_mean[i].append(mean(metrics1[1,:]))
```

[8]:
```
for i in range(9):
    data = []
    for j in range(len(abc_weights[i])):
        data.append([paramVal[i][0], paramVal[i][1],prior_model[i][j],
                     ␣
 ↪abc_pre_generator[i][j],abc_weights[i][j],abc_mae_mean[i][j],abc_mae_skip_mean[i][j]])

    df = pd.DataFrame(data, columns = ['Variance','Bias','Prior Model MAE',
                                       'ABC pre-generator MAE','Skip Node␣
 ↪weight','ABC GAN MAE','ABC_GAN MAE (skip connection)'])
    display(df.round(5))
    print(df.mean(axis=0))
    print("------------------------------------------------------------")
```

	Variance	Bias	Prior Model MAE	ABC pre-generator MAE	Skip Node weight	\
0	1	1	0.29031	1.25478	0.88258	
1	1	1	0.44975	1.23064	0.87832	
2	1	1	0.42078	1.42587	0.98379	
3	1	1	0.43359	1.24520	1.00000	
4	1	1	0.36823	1.10807	0.89985	
5	1	1	0.34959	1.06025	0.99644	
6	1	1	0.40612	1.07032	1.00000	
7	1	1	0.47881	1.22904	0.97343	
8	1	1	0.29692	1.26820	0.96820	
9	1	1	0.32433	1.36152	0.99623	

```
   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.18901                        0.11431
1      0.35030                        0.18303
2      0.19155                        0.25245
3      0.31754                        0.36813
4      0.35659                        0.17494
5      0.22893                        0.23016
6      0.25452                        0.27736
7      0.35585                        0.20099
8      0.20240                        0.20051
9      0.15719                        0.23160

Variance                          1.000000
Bias                              1.000000
Prior Model MAE                   0.381843
ABC pre-generator MAE             1.225388
Skip Node weight                  0.957886
ABC GAN MAE                       0.260389
ABC_GAN MAE (skip connection)     0.223349
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0       0.1     1          0.31186                0.99195           0.98998
1       0.1     1          0.43040                0.72982           1.00000
2       0.1     1          0.35791                1.05063           0.99555
3       0.1     1          0.42437                0.79663           0.95032
4       0.1     1          0.25302                0.95273           0.98694
5       0.1     1          0.36768                0.84921           0.99555
6       0.1     1          0.43353                1.12283           0.86891
7       0.1     1          0.37974                0.97706           0.90165
8       0.1     1          0.30989                0.81079           0.85959
9       0.1     1          0.35632                1.03301           0.91324

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.23428                        0.22337
1      0.52050                        0.31388
2      0.22909                        0.19770
3      0.31949                        0.16097
4      0.28690                        0.17581
5      0.36063                        0.38644
6      0.30905                        0.14942
7      0.26076                        0.25680
8      0.28656                        0.13385
9      0.32711                        0.09685

Variance                          0.100000
Bias                              1.000000
```

```
Prior Model MAE                  0.362473
ABC pre-generator MAE            0.931466
Skip Node weight                 0.946172
ABC GAN MAE                      0.313436
ABC_GAN MAE (skip connection)    0.209509
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0      0.01     1          0.38728                1.09869           0.93346
1      0.01     1          0.53611                1.03067           0.91697
2      0.01     1          0.43641                0.76017           0.99795
3      0.01     1          0.46893                1.05125           0.95772
4      0.01     1          0.41863                0.85753           0.99077
5      0.01     1          0.52122                0.71846           0.97956
6      0.01     1          0.48707                1.00235           0.99346
7      0.01     1          0.25713                0.71231           0.94414
8      0.01     1          0.39914                0.78874           0.99098
9      0.01     1          0.29066                0.89550           1.00000

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.21018                        0.11905
1      0.36758                        0.16454
2      0.23458                        0.21013
3      0.26912                        0.25218
4      0.39182                        0.18677
5      0.38481                        0.24568
6      0.39385                        0.29901
7      0.22267                        0.11580
8      0.29706                        0.20774
9      0.28060                        0.27047

Variance                         0.010000
Bias                             1.000000
Prior Model MAE                  0.420257
ABC pre-generator MAE            0.891566
Skip Node weight                 0.970502
ABC GAN MAE                      0.305227
ABC_GAN MAE (skip connection)    0.207137
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0         1   0.1          0.41257                0.79406           0.44040
1         1   0.1          0.45371                0.95611           0.57612
2         1   0.1          0.39688                0.95095           0.32445
3         1   0.1          0.45879                0.97770           0.43378
4         1   0.1          0.42251                0.92074           0.39263
5         1   0.1          0.34619                1.07108           0.33271
```

```
6         1   0.1          0.34900               1.10251           0.46944
7         1   0.1          0.39553               0.89850           0.49149
8         1   0.1          0.38196               0.90301           0.35572
9         1   0.1          0.35319               1.00198           0.55072

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.35662                        0.23211
1      0.25812                        0.35093
2      0.27764                        0.13033
3      0.31853                        0.25538
4      0.51337                        0.14063
5      0.31402                        0.15233
6      0.30748                        0.22303
7      0.25137                        0.15429
8      0.30805                        0.20916
9      0.31537                        0.25513

Variance                         1.000000
Bias                             0.100000
Prior Model MAE                  0.397033
ABC pre-generator MAE            0.957663
Skip Node weight                 0.436746
ABC GAN MAE                      0.322057
ABC_GAN MAE (skip connection)    0.210332
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0       0.1   0.1          0.33899                0.37605           0.27250
1       0.1   0.1          0.41764                0.42555           0.15203
2       0.1   0.1          0.48043                0.51058           0.13231
3       0.1   0.1          0.39148                0.43552           0.22965
4       0.1   0.1          0.34328                0.33604           0.34110
5       0.1   0.1          0.32535                0.34664           0.21488
6       0.1   0.1          0.32878                0.37201           0.27566
7       0.1   0.1          0.46466                0.48811           0.18800
8       0.1   0.1          0.49138                0.50282           0.23848
9       0.1   0.1          0.41160                0.41921           0.21276

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.25143                        0.17562
1      0.36053                        0.18397
2      0.35165                        0.16087
3      0.29790                        0.20947
4      0.34118                        0.19303
5      0.21494                        0.17605
6      0.25026                        0.14851
7      0.45523                        0.26467
8      0.39383                        0.16588
```

```
9      0.30211                          0.11726
```

```
Variance                          0.100000
Bias                              0.100000
Prior Model MAE                   0.399358
ABC pre-generator MAE             0.421251
Skip Node weight                  0.225738
ABC GAN MAE                       0.321906
ABC_GAN MAE (skip connection)     0.179532
dtype: float64
```

```
   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0      0.01   0.1          0.37124                0.37097           0.15151
1      0.01   0.1          0.47783                0.51363           0.22145
2      0.01   0.1          0.47916                0.49072           0.17568
3      0.01   0.1          0.47156                0.51861           0.15731
4      0.01   0.1          0.42035                0.41502           0.17332
5      0.01   0.1          0.43866                0.43418           0.23907
6      0.01   0.1          0.44115                0.45978           0.16887
7      0.01   0.1          0.28050                0.24813           0.11513
8      0.01   0.1          0.35283                0.36159           0.27447
9      0.01   0.1          0.41108                0.48806           0.05591

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.38960                        0.21936
1      0.30370                        0.21842
2      0.40445                        0.13892
3      0.31611                     1615.63033
4      0.32743                        0.15381
5      0.33322                        0.20196
6      0.24306                      590.99878
7      0.20883                      175.39932
8      0.21419                        0.10956
9      0.35662                      159.88891
```

```
Variance                          0.010000
Bias                              0.100000
Prior Model MAE                   0.414436
ABC pre-generator MAE             0.430069
Skip Node weight                  0.173271
ABC GAN MAE                       0.309720
ABC_GAN MAE (skip connection)    254.295937
dtype: float64
```

```
   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0         1  0.01          0.33825                1.06361           0.30817
1         1  0.01          0.44252                1.10204           0.29916
2         1  0.01          0.36814                0.97746           0.31601
```

```
3         1  0.01          0.42011                1.06187           0.29280
4         1  0.01          0.37682                0.98590           0.32761
5         1  0.01          0.52305                1.02595           0.30050
6         1  0.01          0.37340                0.96680           0.34648
7         1  0.01          0.48357                1.05886           0.26469
8         1  0.01          0.35782                0.84048           0.27136
9         1  0.01          0.35840                1.04120           0.29938

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.22549                        0.32862
1      0.36002                        0.32687
2      0.31995                        0.26308
3      0.27231                        0.23630
4      0.19788                        0.25539
5      0.30124                        0.29729
6      0.23836                        0.21219
7      0.42704                        0.28547
8      0.16703                        0.19012
9      0.28642                        0.17383

Variance                          1.000000
Bias                              0.010000
Prior Model MAE                   0.404209
ABC pre-generator MAE             1.012418
Skip Node weight                  0.302617
ABC GAN MAE                       0.279575
ABC_GAN MAE (skip connection)     0.256915
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0       0.1  0.01          0.51085                0.50383           0.13876
1       0.1  0.01          0.38288                0.39016           0.24636
2       0.1  0.01          0.35142                0.31922           0.13227
3       0.1  0.01          0.30469                0.34309           0.19530
4       0.1  0.01          0.28459                0.31449           0.10088
5       0.1  0.01          0.59744                0.56481           0.17860
6       0.1  0.01          0.27812                0.26587           0.17723
7       0.1  0.01          0.48638                0.48275           0.13708
8       0.1  0.01          0.41875                0.37538           0.11681
9       0.1  0.01          0.38843                0.42875           0.31244

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.35834                        0.22991
1      0.23741                        0.18503
2      0.30161                        0.19806
3      0.23678                       24.90852
4      0.31357                       12.18260
5      0.24711                        0.34491
```

```
6      0.17466                        0.19405
7      0.28122                        0.32425
8      0.31075                       79.04335
9      0.32104                        0.25826

Variance                          0.100000
Bias                              0.010000
Prior Model MAE                   0.400355
ABC pre-generator MAE             0.398835
Skip Node weight                  0.173574
ABC GAN MAE                       0.278248
ABC_GAN MAE (skip connection)    11.786895
dtype: float64
------------------------------------------------------------

   Variance  Bias  Prior Model MAE  ABC pre-generator MAE  Skip Node weight  \
0      0.01  0.01          0.35989                0.36228           0.12434
1      0.01  0.01          0.49100                0.48709           0.14930
2      0.01  0.01          0.31965                0.31279           0.14853
3      0.01  0.01          0.48614                0.48666           0.07869
4      0.01  0.01          0.44581                0.44646           0.18750
5      0.01  0.01          0.33082                0.33031           0.16819
6      0.01  0.01          0.34958                0.35190           0.12512
7      0.01  0.01          0.42027                0.41859           0.21003
8      0.01  0.01          0.43336                0.43338           0.12368
9      0.01  0.01          0.38277                0.38477           0.14843

   ABC GAN MAE  ABC_GAN MAE (skip connection)
0      0.27899                        0.16319
1      0.47686                        0.32685
2      0.38471                      324.35423
3      0.36744                       47.89028
4      0.37733                        0.27410
5      0.30089                      170.24077
6      0.25503                      122.50966
7      0.29019                       76.77868
8      0.27799                        0.33361
9      0.24476                       58.47750

Variance                          0.010000
Bias                              0.010000
Prior Model MAE                   0.401928
ABC pre-generator MAE             0.401425
Skip Node weight                  0.146381
ABC GAN MAE                       0.325419
ABC_GAN MAE (skip connection)    80.134887
dtype: float64
------------------------------------------------------------
```