Supplemental Material 4

Results for the performance of the ABBM on the synchronization task are shown in **Figure S4.1**. Regardless of the type of functional network used, the population achieved maximal fitness values within the first few generations of the GA. The chromosome at the final generation of the GA was able to perform synchronization from any of the tested initial configurations across densities. The same is true for each of the null models (**Figure S4.2**). These findings indicate that the synchronization task is a far easier problem for the ABBM than the density-classification problem. **Table S4.1** contains the ABBM parameters used to solve the synchronization task. Time-space diagrams show the process used to solve the synchronization task at varying densities using the thresholded, weighted network.

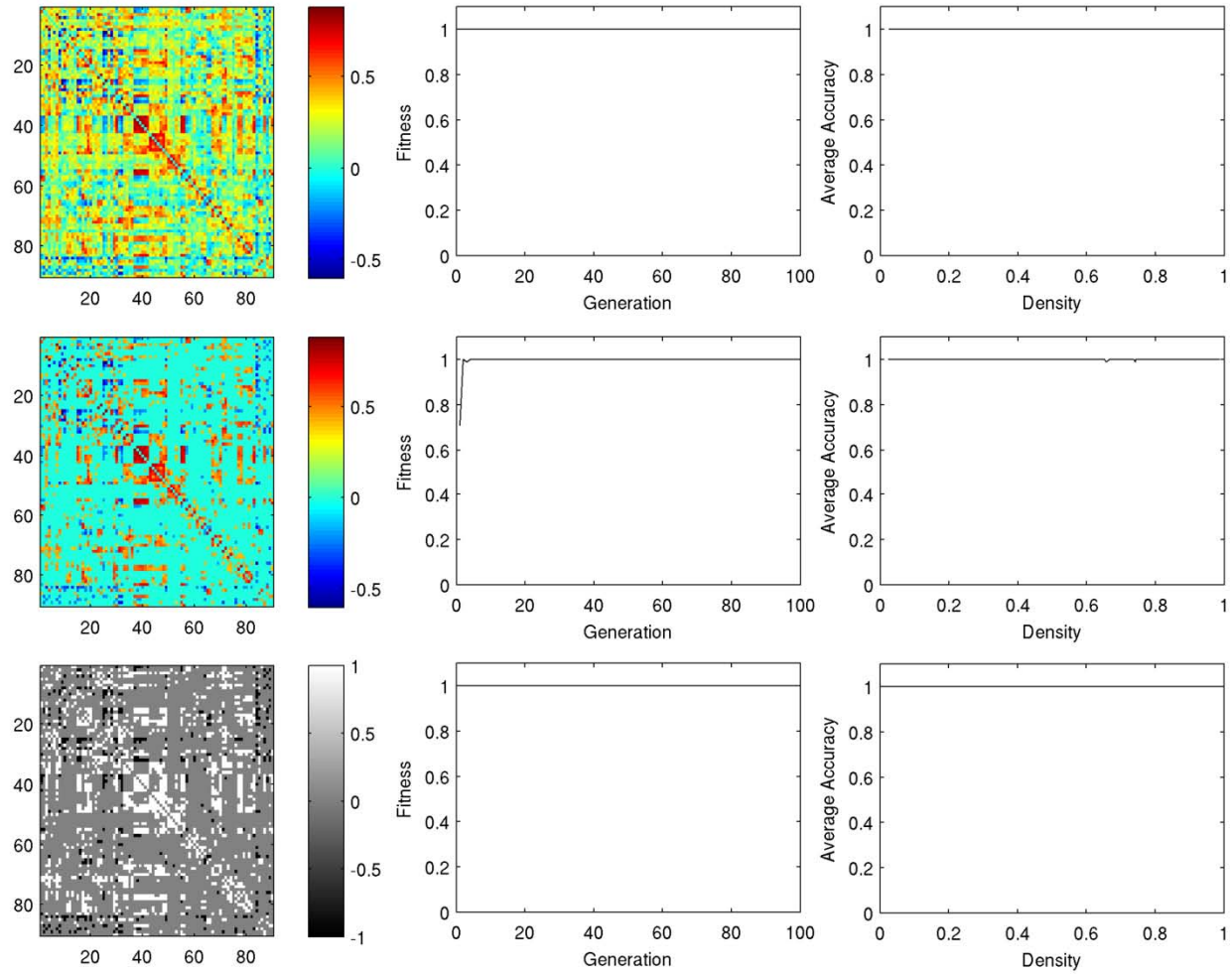


Figure S4.1. Synchronization task using the ABBM. Results are shown for the fully connected correlation matrix (top), thresholded correlation matrix (middle), and adjacency matrix (bottom). Each network is able to produce synchronization.

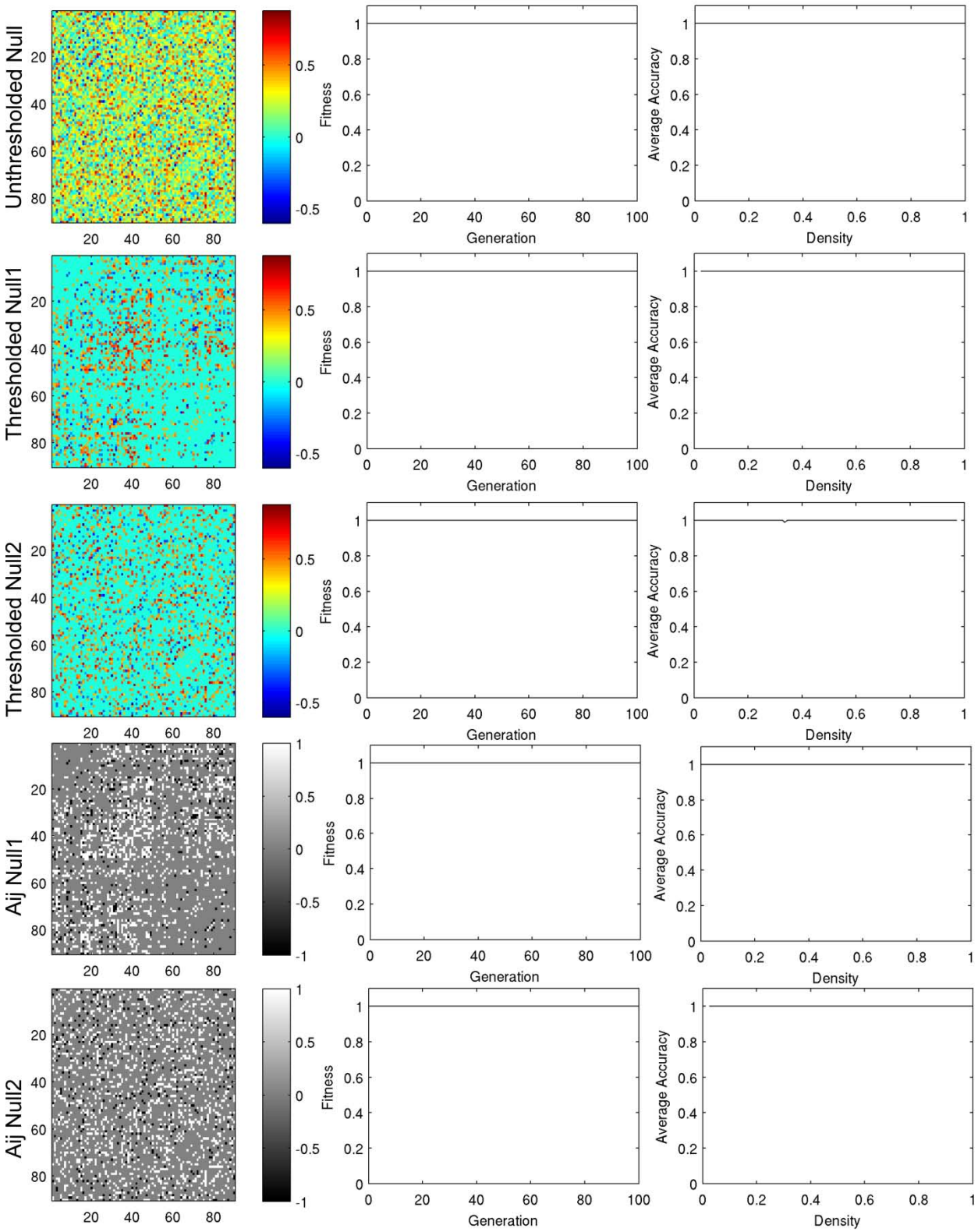
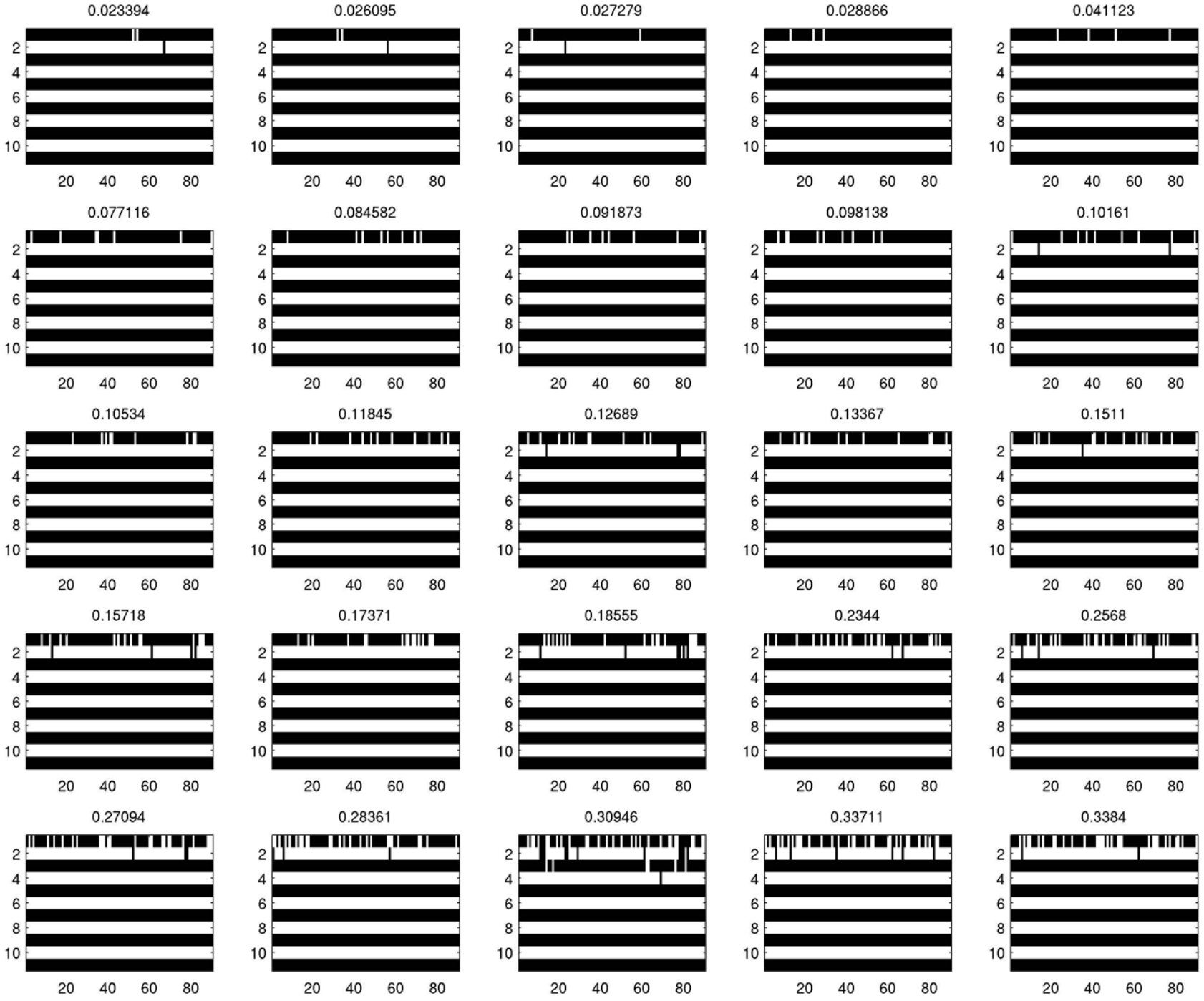


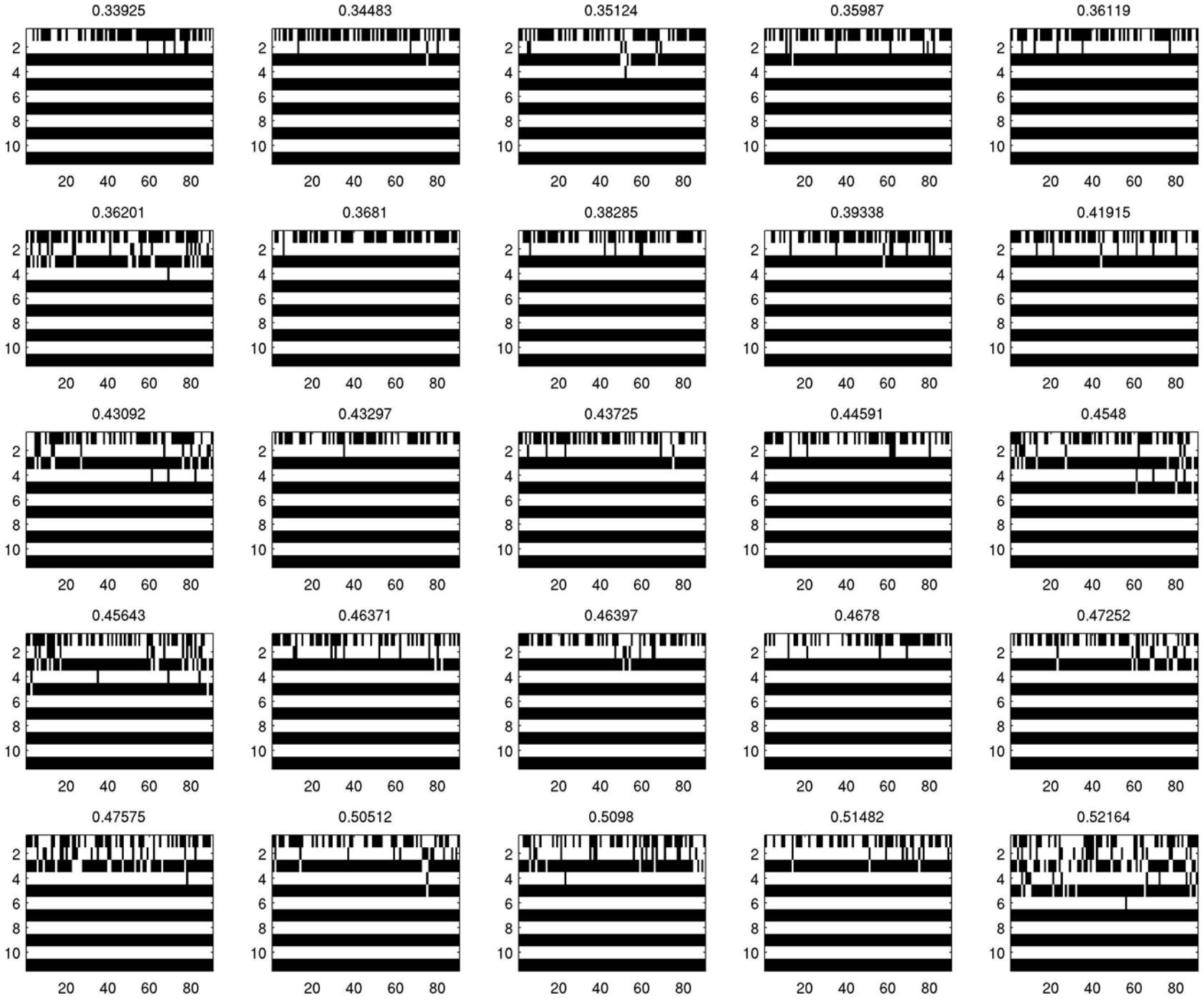
Figure S4.2. Synchronization task using null network models. Results are shown for a fully connected randomized correlation matrix, thresholded $null_1$ and $null_2$ models,

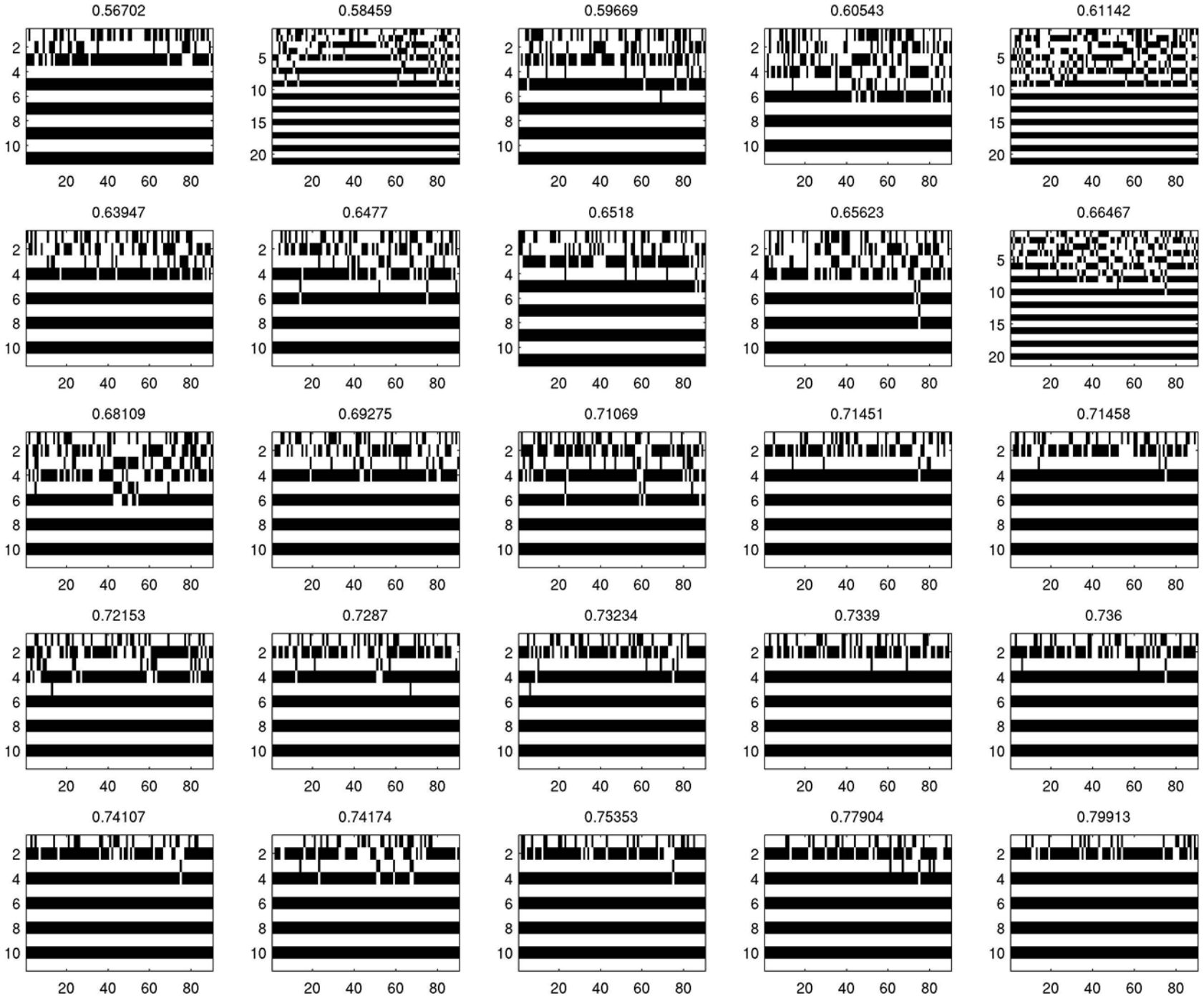
and adjacency matrix null models. Once again, all networks are able to perform the synchronization task.

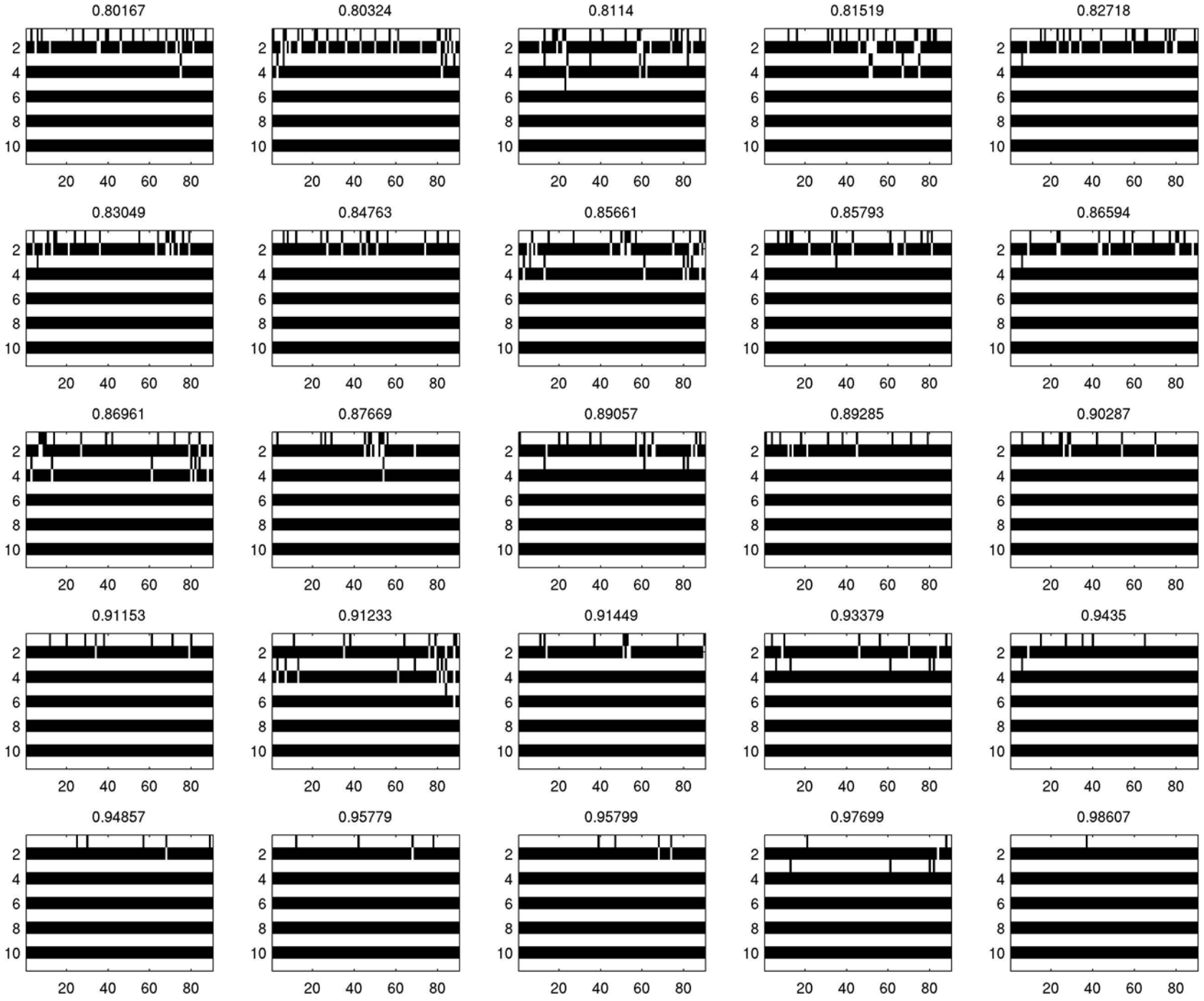
Table S4.1. ABBM parameters for solving the synchronization task.

Original networks			
	τ_p	τ_n	Rule (binary form)
Full Correlation	0.3	0.52	13 (00001101)
Thresh. Correlation	0.66	0.76	29 (00011101)
Binary	0.72	0.87	29 (00011101)
Null models			
$Null_2$ Full Corr.	0.46	0.4	89 (01011001)
$Null_1$ Thresh. Corr.	0.34	0.72	39 (00100111)
$Null_2$ Thresh. Corr.	0.36	0.4	7 (00000111)
$Null_1$ Binary	0.25	0.55	9 (00001001)
$Null_2$ Binary	0.66	0.56	9 (00001001)


0.023394
0.026095
0.027279
0.028866
0.041123
0.077116
0.084582
0.091873
0.098138
0.10161
0.10534
0.11845
0.12689
0.13367
0.1511
0.15718
0.17371
0.18555
0.2344
0.2568
0.27094
0.28361
0.30946
0.33711
0.3384
2
4
6
8
10
20
40
60
80


0.33925
0.34483
0.35124
0.35987
0.36119
0.36201
0.3681
0.38285
0.39338
0.41915
0.43092
0.43297
0.43725
0.44591
0.4548
0.45643
0.46371
0.46397
0.4678
0.47252
0.47575
0.50512
0.5098
0.51482
0.52164
2
4
6
8
10
20
40
60
80


0.56702
0.58459
0.59669
0.60543
0.61142
0.63947
0.6477
0.6518
0.65623
0.66467
0.68109
0.69275
0.71069
0.71451
0.71458
0.72153
0.7287
0.73234
0.7339
0.736
0.74107
0.74174
0.75353
0.77904
0.79913


0.80167
0.80324
0.8114
0.81519
0.82718
0.83049
0.84763
0.85661
0.85793
0.86594
0.86961
0.87669
0.89057
0.89285
0.90287
0.91153
0.91233
0.91449
0.93379
0.9435
0.94857
0.95779
0.95799
0.97699
0.98607
2
4
6
8
10
20
40
60
80