

1. COLLECTED DATA AND DESIGNED MATRICES

1.1. Lorenz network with fully-interconnected topology.

Collected data and $\mathcal{H}_i(x_i)$ are not reported for the Lorenz network with the fully-interconnected topology due to its high dimensions (as we gathered 20 data points).

Designed matrices via SOSTOOLS.

$$P_i = \begin{bmatrix} 0.9232 & 0.4012 & 0.04413 \\ 0.4012 & 1.277 & 0.05585 \\ 0.04413 & 0.05585 & 0.5374 \end{bmatrix}$$

1.2. Lorenz network with ring topology.

Collected data.

$$\begin{aligned} \mathcal{U}_i^{0,\mathcal{T}} &= \begin{bmatrix} 0.0668088 & -0.02549592 & -0.0182191 & -0.04384522 & 0.2505557 \\ -0.06066127 & 0.1746004 & 0.0121776 & 0.01511014 & 0.09662926 \end{bmatrix} \\ \mathcal{W}_i^{0,\mathcal{T}} &= \begin{bmatrix} 4.4065 & -3.0888 & 7.5623 & -6.038 & 7.8921 \\ -19.995 & -4.1293 & -18.904 & 12.03 & -16.598 \\ -11.86 & 2.329 & 10.228 & 28.096 & -27.657 \\ -14.13 & -3.2322 & -3.3078 & -7.463 & -13.207 \\ -24.46 & 11.113 & 3.5214 & 11.539 & 22.689 \\ -1.5778 & 6.6925 & 5.7856 & -7.3994 & -8.9327 \\ 18.316 & -19.268 & -15.871 & -19.225 & 2.9647 \\ 1.9899 & 15.009 & -3.1264 & 10.73 & -21.196 \\ 7.6751 & 19.554 & 16.344 & -11.535 & 3.5722 \\ -11.069 & 14.89 & -12.383 & -14.067 & 11.986 \end{bmatrix} \\ \mathcal{X}_i^{0,\mathcal{T}} &= \begin{bmatrix} 0.2 & 0.1995594 & 0.2055391 & 0.2151517 & 0.2307163 \\ 0.2 & 0.2562676 & 0.3092281 & 0.3647595 & 0.4189281 \\ 0.2 & 0.1962527 & 0.191178 & 0.1854501 & 0.1780942 \\ 0.2487483 & 0.2722851 & 0.2987597 & 0.3299771 & 0.3671264 \\ 0.4825383 & 0.5437239 & 0.6167189 & 0.6940708 & 0.779307 \\ 0.1765215 & 0.1720544 & 0.1664339 & 0.1628055 & 0.1579283 \end{bmatrix} \\ \mathcal{X}_i^{1,\mathcal{T}} &= \begin{bmatrix} -0.0440649 & 0.5979706 & 0.9612673 & 1.556457 & 1.803197 \\ 5.626763 & 5.296051 & 5.553133 & 5.416867 & 6.361013 \\ -0.3747329 & -0.5074664 & -0.572794 & -0.7355906 & -0.1572614 \\ 2.353678 & 2.647464 & 3.121736 & 3.714931 & 4.211134 \\ 6.118566 & 7.299495 & 7.735189 & 8.523623 & 9.281109 \\ -0.4467139 & -0.5620505 & -0.3628361 & -0.4877273 & -0.1511996 \end{bmatrix} \end{aligned}$$

$$\mathcal{N}_i^{0,\tau} = \begin{bmatrix} 0.2 & 0.2 & 0.2054268 & 0.2155803 & 0.2300822 & 0.2486879 \\ 0.2 & 0.2542681 & 0.3069619 & 0.360599 & 0.4161397 & 0.4779494 \\ 0.2 & 0.1950667 & 0.190255 & 0.1855724 & 0.1810239 & 0.1766131 \\ 0.04 & 0.03901333 & 0.03908348 & 0.04000576 & 0.04165036 & 0.04392154 \\ 0.2716141 & 0.2985534 & 0.3298906 & 0.3656712 & & \\ 0.5410073 & 0.6119257 & 0.6876963 & 0.7710712 & & \\ 0.1723426 & 0.1682149 & 0.1642314 & 0.1603937 & & \\ 0.04681067 & 0.05022113 & 0.05417839 & 0.05865134 & & \end{bmatrix}$$

Designed matrices via SOSTOOLS.

$$P_i = \begin{bmatrix} 0.3833083 & -0.0349399 & -0.0394466 & -0.4972237 \\ -0.0349399 & 0.2708167 & 0.02576205 & 0.01163243 \\ -0.0394466 & 0.02576205 & 0.3515435 & -0.1655471 \\ -0.4972237 & 0.01163243 & -0.1655471 & 3.649099 \end{bmatrix}$$

$$\mathcal{H}_i(x_i) = \begin{bmatrix} 0.075758x_{i1} + 0.036988x_{i3} - 74.1532 & -0.10561x_{i1} + 0.26213x_{i3} - 101.0499 \\ -0.056251x_{i1} - 0.89369x_{i3} + 134.0211 & -0.42291x_{i1} + 0.31752x_{i3} + 90.7323 \\ -0.27685x_{i1} + 2.2485x_{i3} + 99.1689 & 1.7712x_{i1} - 2.338x_{i3} + 147.2233 \\ 0.19404x_{i1} - 1.3922x_{i3} + 92.1251 & -1.1482x_{i1} + 1.4633x_{i3} + 140.7117 \\ 0.23484x_{i1} - 0.0058491x_{i3} - 272.0331 & -0.38373x_{i1} + 0.95196x_{i3} - 571.5938 \\ -0.04198x_{i1} - 0.12838x_{i3} - 22.2354 & -188.2936x_{i1} - 93.9036x_{i3} + 270.7938 \\ -0.39308x_{i1} + 0.23788x_{i3} - 4.8555 & 500.4161x_{i1} - 152.4501x_{i3} - 132.5379 \\ 1.3153x_{i1} + 0.081227x_{i3} - 15.8446 & -291.7273x_{i1} + 932.8329x_{i3} - 279.098 \\ -0.81924x_{i1} - 0.097115x_{i3} + 90.1961 & 99.5045x_{i1} - 557.0909x_{i3} - 162.5739 \\ -0.20206x_{i1} - 0.36796x_{i3} + 55.1892 & -504.4188x_{i1} - 372.6263x_{i3} - 82.4856 \\ 0.049335x_{i1} - 0.54325x_{i3} + 45.5693 & -0.4134x_{i1} + 0.42321x_{i3} + 302.8683 \\ -0.33457x_{i1} - 0.23843x_{i3} - 104.8484 & 0.45743x_{i1} - 0.93764x_{i3} - 237.4444 \\ 0.048719x_{i1} + 1.6871x_{i3} - 60.6103 & 0.87788x_{i1} - 0.90058x_{i3} + 235.4064 \\ 0.073817x_{i1} - 1.0096x_{i3} + 65.9958 & -0.71809x_{i1} + 0.82269x_{i3} + 147.0327 \\ -0.008702x_{i1} + 0.10983x_{i3} + 74.3084 & 0.084844x_{i1} - 0.063494x_{i3} - 153.8552 \\ -0.28949x_{i1} - 0.0025977x_{i3} + 24.7347 & 78.1768x_{i1} - 145.0668x_{i3} + 170.0401 \\ 0.11536x_{i1} + 0.60551x_{i3} - 149.7123 & 937.7484x_{i1} + 265.0077x_{i3} + 196.7082 \\ 0.80387x_{i1} - 0.36908x_{i3} + 24.7584 & -850.0966x_{i1} + 429.9044x_{i3} + 252.4829 \\ -0.54338x_{i1} + 0.0394x_{i3} + 6.3175 & 230.0897x_{i1} - 321.8305x_{i3} + 93.6185 \\ 0.054241x_{i1} + 0.0010511x_{i3} + 5.8483 & -11.3267x_{i1} + 14.7409x_{i3} - 322.128 \end{bmatrix}$$

1.3. Spacecraft network with line interconnection topology.

Collected data.

$$\begin{aligned}
 \mathcal{U}_i^{0,\mathcal{T}} &= \begin{bmatrix} -1.65956 & -6.274796 & -5.910955 & -7.192261 & 7.527783 \\ 4.40649 & -3.088785 & 7.562349 & -6.03797 & 7.892133 \\ -9.997713 & -2.064651 & -9.452248 & 6.014891 & -8.299116 \\ -8.033063 & 3.730019 & -4.39112 & -4.244493 & -0.1685368 \\ -1.577847 & 6.692513 & 5.785587 & -7.399429 & -8.932749 \\ 9.157791 & -9.634234 & -7.93548 & -9.612661 & 1.482352 \end{bmatrix} \\
 \mathcal{W}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.39533 & 0.077633 & 0.34094 & 0.93652 & -0.92189 \\ -1.413 & -0.32322 & -0.33078 & -0.7463 & -1.3207 \\ -2.446 & 1.1113 & 0.35214 & 1.1539 & 2.2689 \\ 0.066331 & 0.50029 & -0.10421 & 0.35767 & -0.70654 \\ 0.76751 & 1.9554 & 1.6344 & -1.1535 & 0.35722 \\ -1.1069 & 1.489 & -1.2383 & -1.4067 & 1.1986 \end{bmatrix} \\
 \mathcal{X}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.5 & -0.5012774 & -0.5046163 & -0.5076398 & -0.5110001 \\ 0.5 & 0.5012468 & 0.4993005 & 0.5026753 & 0.4990483 \\ 0.1 & 0.09585211 & 0.09553433 & 0.09250096 & 0.09489057 \\ -0.507934 & -0.5121505 & -0.5102749 & -0.5127573 & -0.5149292 \\ 0.5020916 & 0.5014506 & 0.5055298 & 0.5090029 & 0.5044962 \\ 0.09288048 & 0.09556411 & 0.09284903 & 0.0897911 & 0.08611797 \end{bmatrix} \\
 \mathcal{X}_i^{1,\mathcal{T}} &= \begin{bmatrix} -0.1277447 & -0.3338809 & -0.3023512 & -0.3360359 & 0.3066171 \\ 0.1246757 & -0.1946246 & 0.3374743 & -0.3626923 & 0.3043282 \\ -0.4147894 & -0.03177778 & -0.303337 & 0.2389609 & -0.2010087 \\ -0.4216539 & 0.187555 & -0.2482356 & -0.2171931 & -0.06547708 \\ -0.06410553 & 0.4079263 & 0.3473092 & -0.4506663 & -0.4509487 \\ 0.2683628 & -0.271508 & -0.3057932 & -0.3673127 & 0.08936341 \end{bmatrix} \\
 \mathcal{N}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.5 & -0.5012774 & -0.5046163 & -0.5076398 & -0.5110001 \\ 0.5 & 0.5012468 & 0.4993005 & 0.5026753 & 0.4990483 \\ -0.4147894 & -0.03177778 & -0.303337 & 0.2389609 & -0.2010087 \\ 0.1 & 0.09585211 & 0.09553433 & 0.09250096 & 0.09489057 \\ -0.25 & -0.2512637 & -0.2519552 & -0.2551779 & -0.2550138 \\ -0.507934 & -0.5121505 & -0.5102749 & -0.5127573 & -0.5149292 \\ 0.5020916 & 0.5014506 & 0.5055298 & 0.5090029 & 0.5044962 \\ 0.09288048 & 0.09556411 & 0.09284903 & 0.0897911 & 0.08611797 \\ -0.2550294 & -0.2568182 & -0.2579592 & -0.260995 & -0.2597799 \end{bmatrix}
 \end{aligned}$$

Designed matrices via SOSTOOLS.

$$P_i = \begin{bmatrix} 2.884255 & 0.2560449 & -0.6495035 & -1.273517 \\ 0.2560449 & 2.936587 & -1.182563 & 0.6600153 \\ -0.6495035 & -1.182563 & 3.037709 & -0.7206841 \\ -1.273517 & 0.6600153 & -0.7206841 & 4.947232 \end{bmatrix}$$

$$\mathcal{H}_i(x_i) = \begin{bmatrix} -0.0050775x_{i1} - 0.0030262x_{i2} + 8.5526 & -0.019353x_{i1} + 0.0035379x_{i2} + 28.3333 \\ -0.003733x_{i1} - 0.00066252x_{i2} + 2.1674 & -0.011954x_{i1} + 0.002882x_{i2} + 26.8859 \\ 0.015829x_{i1} - 0.012847x_{i2} - 4.2877 & -0.015462x_{i1} - 0.014552x_{i2} - 21.1204 \\ -0.0061806x_{i1} + 0.021467x_{i2} + 2.1102 & 0.041884x_{i1} + 0.0085075x_{i2} - 1.6194 \\ -0.0026483x_{i1} - 0.0088471x_{i2} - 23.6859 & -0.024041x_{i1} + 0.00057582x_{i2} - 3.2796 \\ 0.014159x_{i1} + 0.00949x_{i2} + 24.3507 & -3.5292x_{i1} - 24.6667x_{i2} + 4.096 \\ 0.010062x_{i1} + 0.0049411x_{i2} + 5.3721 & 2.0819x_{i1} - 13.4841x_{i2} + 26.6087 \\ 0.015568x_{i1} + 0.017436x_{i2} + 24.1056 & 15.9605x_{i1} + 50.8523x_{i2} + 33.3746 \\ -0.024766x_{i1} - 0.033183x_{i2} - 6.3394 & 23.3447x_{i1} + 18.0607x_{i2} - 2.4366 \\ 0.013253x_{i1} + 0.015818x_{i2} - 10.9901 & -18.0344x_{i1} - 31.3758x_{i2} + 7.8234 \\ -0.0025288x_{i1} + 0.016381x_{i2} + 10.7718 & 0.057809x_{i1} + 0.0045168x_{i2} - 16.6635 \\ -0.0028299x_{i1} + 0.013104x_{i2} - 3.8685 & 0.018334x_{i1} + 0.0045467x_{i2} - 18.4989 \\ 0.009983x_{i1} - 0.019523x_{i2} + 23.7425 & -0.0064158x_{i1} - 0.011454x_{i2} - 13.143 \\ -0.00079999x_{i1} + 0.0019018x_{i2} + 12.7119 & -0.012609x_{i1} + 0.0011303x_{i2} + 11.9147 \\ -0.0020133x_{i1} - 0.0079501x_{i2} - 28.5916 & -0.028197x_{i1} + 0.00030834x_{i2} + 7.8996 \\ -0.049214x_{i1} - 0.03576x_{i2} - 45.8161 & -16.639x_{i1} + 2.4963x_{i2} - 5.3769 \\ -0.004985x_{i1} - 0.017134x_{i2} + 32.3754 & 29.7602x_{i1} + 23.2296x_{i2} - 38.5494 \\ -0.01284x_{i1} + 0.017601x_{i2} - 32.3888 & -57.0942x_{i1} - 20.4649x_{i2} - 20.1725 \\ 0.018144x_{i1} + 0.0037967x_{i2} + 37.8755 & 28.0801x_{i1} + 15.2911x_{i2} - 35.4936 \\ 0.020623x_{i1} + 0.016996x_{i2} - 28.1924 & -3.9284x_{i1} - 19.9377x_{i2} + 30.777 \end{bmatrix}$$

1.4. Lu network with star interconnection topology.

Collected data.

$$\mathcal{U}_i^{0,\mathcal{T}} = \begin{bmatrix} 0.0668088 & -0.02549592 & -0.0182191 & -0.04384522 & 0.2505557 & -0.06066127 \\ 0.1746004 & 0.0121776 & 0.01511014 & 0.09662926 & & \end{bmatrix}$$

$$\mathcal{W}_i^{0,\mathcal{T}} = \begin{bmatrix} 4.4065 & -3.0888 & 7.5623 & -6.038 & 7.8921 \\ -19.995 & -4.1293 & -18.904 & 12.03 & -16.598 \\ -11.86 & 2.329 & 10.228 & 28.096 & -27.657 \\ -14.13 & -3.2322 & -3.3078 & -7.463 & -13.207 \\ -24.46 & 11.113 & 3.5214 & 11.539 & 22.689 \\ -1.5778 & 6.6925 & 5.7856 & -7.3994 & -8.9327 \\ 18.316 & -19.268 & -15.871 & -19.225 & 2.9647 \\ 1.9899 & 15.009 & -3.1264 & 10.73 & -21.196 \\ 7.6751 & 19.554 & 16.344 & -11.535 & 3.5722 \\ -11.069 & 14.89 & -12.383 & -14.067 & 11.986 \end{bmatrix}$$

$$\mathcal{X}_i^{0,\mathcal{T}} = \begin{bmatrix} 0.4 & 0.3999559 & 0.4400592 & 0.5166144 & 0.6311519 \\ 0.4 & 0.511268 & 0.6529227 & 0.8346064 & 1.066651 \\ 0.4 & 0.3217186 & 0.2593964 & 0.2102881 & 0.1722612 \\ 0.7878527 & 0.9963247 & 1.266752 & 1.616247 & 2.065179 \\ 1.366898 & 1.747698 & 2.237731 & 2.863075 & 3.663087 \\ 0.1448177 & 0.1266034 & 0.1185454 & 0.1232141 & 0.1447383 \end{bmatrix}$$

$$\mathcal{X}_i^{1,\mathcal{T}} = \begin{bmatrix} -0.00440649 & 4.010325 & 7.655524 & 11.45375 & 15.67008 & 20.8472 \\ 11.1268 & 14.16547 & 18.16837 & 23.20447 & 30.02466 & 38.08006 \\ -7.82814 & -6.232216 & -4.910832 & -3.802688 & -2.744349 & -1.821431 \\ 27.04276 & 34.94945 & 44.8932 & 57.53364 \\ 49.00328 & 62.53435 & 80.00128 & 102.3612 \\ -0.8058024 & 0.4668692 & 2.152423 & 4.69136 \end{bmatrix}$$

$$\mathcal{N}_i^{0,\mathcal{T}} = \begin{bmatrix} 0.4 & 0.4 & 0.4399845 & 0.5165354 & 0.6308363 & 0.7875109 \\ 0.4 & 0.5110681 & 0.6526258 & 0.8340378 & 1.066044 & 1.365953 \\ 0.4 & 0.3216 & 0.2593243 & 0.2103309 & 0.1725728 & 0.1447832 \\ 0.16 & 0.12864 & 0.1140987 & 0.1086433 & 0.1088652 & 0.1140184 \\ 0.16 & 0.2044272 & 0.2871452 & 0.43081 & 0.6724989 & 1.075703 \\ 0.9957499 & 1.266082 & 1.615334 & 2.06377 \\ 1.746673 & 2.236226 & 2.860989 & 3.660227 \\ 0.1265836 & 0.1186594 & 0.12324 & 0.1448065 \\ 0.1260456 & 0.1502325 & 0.1990737 & 0.2988473 \\ 1.739249 & 2.831246 & 4.621453 & 7.553866 \end{bmatrix}$$

Designed matrices via SOSTOOLS.

$$P_i = \begin{bmatrix} 21.37505 & -11.47423 & -3.595229 & 0.05718377 & 0.17283 \\ -11.47423 & 35.08873 & 2.771515 & 0.1302082 & -0.06357276 \\ -3.595229 & 2.771515 & 13.50339 & -0.1761119 & -0.1984627 \\ 0.05718377 & 0.1302082 & -0.1761119 & 0.7860175 & -0.014718 \\ 0.17283 & -0.06357276 & -0.1984627 & -0.014718 & 0.157867 \end{bmatrix}$$

$$\mathcal{H}_i(x_i) = \begin{bmatrix} -0.00069728x_{i1} + 0.0056575x_{i2} - 0.011124x_{i3} - 2.4433 \\ -0.016076x_{i1} - 0.017077x_{i2} + 0.037277x_{i3} + 18.4743 \\ 0.056437x_{i1} + 0.011625x_{i2} - 0.034716x_{i3} - 35.4399 \\ -0.035053x_{i1} - 0.0010258x_{i2} + 0.0086157x_{i3} + 18.8652 \\ -0.030452x_{i1} + 0.013418x_{i2} - 0.018648x_{i3} + 1.635 \\ 0.0050612x_{i1} - 0.0058251x_{i2} + 0.0089445x_{i3} + 5.0602 \\ 0.024937x_{i1} - 0.026953x_{i2} + 0.048978x_{i3} + 3.6814 \\ 0.018603x_{i1} + 0.028229x_{i2} - 0.060068x_{i3} - 26.1567 \\ -0.033087x_{i1} - 0.0083062x_{i2} + 0.023424x_{i3} + 21.5767 \\ 0.0098221x_{i1} + 0.00030115x_{i2} - 0.0026524x_{i3} - 5.2934 \\ 1.3832x_{i1} + 0.00055615x_{i2} + 0.0099723x_{i3} + 4.7252 \\ -3.8449x_{i1} + 0.0053846x_{i2} - 0.037676x_{i3} - 24.3346 \\ 1.7946x_{i1} - 0.021523x_{i2} + 0.044436x_{i3} + 43.7564 \\ 0.41043x_{i1} + 0.012252x_{i2} - 0.017662x_{i3} - 4.0989 \\ 3.7284x_{i1} + 0.016879x_{i2} + 0.01563x_{i3} - 57.2773 \\ -1.438x_{i1} - 0.0060528x_{i2} - 0.011908x_{i3} + 43.1485 \\ -6.9974x_{i1} - 0.01015x_{i2} - 0.037687x_{i3} - 22.31 \\ 6.5033x_{i1} - 0.0059689x_{i2} + 0.058808x_{i3} + 38.3438 \\ -1.4174x_{i1} + 0.012782x_{i2} - 0.028539x_{i3} - 29.5852 \\ -0.10324x_{i1} - 0.0039248x_{i2} + 0.0045261x_{i3} + 6.9478 \end{bmatrix}$$

$$\begin{aligned}
& -0.037095x_{i1} + 0.0013183x_{i2} + 0.003876x_{i3} + 3.6515 \\
& 0.079649x_{i1} - 0.010353x_{i2} - 0.0036756x_{i3} - 7.3381 \\
& 0.02705x_{i1} + 0.022897x_{i2} - 0.017784x_{i3} - 5.5979 \\
& -0.052934x_{i1} - 0.013282x_{i2} + 0.01333x_{i3} + 9.008 \\
& -0.14874x_{i1} - 0.0046078x_{i2} + 0.026867x_{i3} + 15.2807 \\
& 0.054212x_{i1} - 0.0018832x_{i2} - 0.010215x_{i3} - 4.2153 \\
& 0.21319x_{i1} + 0.0017817x_{i2} - 0.026986x_{i3} - 26.0735 \\
& -0.14547x_{i1} + 0.01423x_{i2} + 0.0094068x_{i3} + 15.1751 \\
& -0.0069319x_{i1} - 0.013706x_{i2} + 0.0097569x_{i3} + 2.8064 \\
& 0.015823x_{i1} + 0.0034596x_{i2} - 0.0042857x_{i3} - 2.3296 \\
& -36.965x_{i1} + 0.056722x_{i2} + 2.4276x_{i3} + 24.0778 \\
& 102.0277x_{i1} - 0.075014x_{i2} - 49.3035x_{i3} - 36.1736 \\
& -45.6081x_{i1} - 0.19132x_{i2} + 137.956x_{i3} - 24.865 \\
& -12.0717x_{i1} + 0.16379x_{i2} - 86.2537x_{i3} + 16.6755 \\
& -101.7951x_{i1} + 0.327x_{i2} - 45.4643x_{i3} + 0.74174 \\
& 39.4727x_{i1} - 0.11617x_{i2} - 5.716x_{i3} + 58.0411 \\
& 187.6616x_{i1} - 0.37636x_{i2} + 41.4728x_{i3} + 1.2018 \\
& -172.8804x_{i1} + 0.16467x_{i2} + 62.5206x_{i3} - 15.1238 \\
& 36.438x_{i1} + 0.10038x_{i2} - 81.1078x_{i3} - 45.3458 \\
& 3.1812x_{i1} - 0.050283x_{i2} + 22.4591x_{i3} + 25.2855 \\
& -0.53666x_{i1} + 2.4902x_{i2} + 0.15668x_{i3} - 2.6943 \\
& 13.692x_{i1} - 50.1085x_{i2} - 0.59883x_{i3} + 2.4088 \\
& -37.0641x_{i1} + 140.0403x_{i2} + 0.71883x_{i3} + 2.9867 \\
& 41.0891x_{i1} - 87.4903x_{i2} - 0.29946x_{i3} + 0.22438 \\
& -40.793x_{i1} - 46.1794x_{i2} + 0.26348x_{i3} + 0.1666 \\
& 48.5418x_{i1} - 5.7304x_{i2} - 0.21043x_{i3} - 2.7762 \\
& -23.831x_{i1} + 41.9295x_{i2} - 0.57805x_{i3} - 0.57542 \\
& -15.1291x_{i1} + 63.577x_{i2} + 0.93125x_{i3} - 2.5068 \\
& 18.7873x_{i1} - 82.3464x_{i2} - 0.459x_{i3} - 0.079577 \\
& -4.9111x_{i1} + 22.7932x_{i2} + 0.074022x_{i3} + 2.2276
\end{aligned}$$

1.5. Duffing oscillator Network with ring interconnection topology.

Collected data.

$$\begin{aligned}
\mathcal{U}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.165956 & -0.7064882 & -0.2064651 & -0.5910955 & -0.1653904 \\ 0.6014891 & 0.7527783 & -0.6603392 & 0.9157791 & 0.3730019 \end{bmatrix} \\
\mathcal{W}_i^{0,\mathcal{T}} &= \begin{bmatrix} 0.35252 & -0.65226 & 0.062107 & 0.60499 & 0.093904 \\ -0.79982 & -0.50198 & -0.12929 & -0.75618 & -0.57538 \\ -3.1635 & -1.5088 & 2.6027 & 2.029 & -11.27 \\ 0.74922 & 0.63137 & 0.60503 & 0.053064 & 0.5354 \\ -0.29852 & -0.66393 & -0.64265 & 0.307 & -0.77074 \\ 2.9137 & -40.115 & -0.20112 & -2.5718 & 6.4111 \end{bmatrix} \\
\mathcal{X}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.05 & -0.0495 & -0.04903965 & -0.0488311 & -0.04868731 \\ 0.05 & 0.04603517 & 0.02085527 & 0.01437835 & -0.0008886095 \\ -0.0486962 & -0.04875482 & -0.0486001 & -0.04819361 & -0.04796186 \\ -0.005862079 & 0.01547219 & 0.04064864 & 0.02317551 & 0.05031751 \end{bmatrix}
\end{aligned}$$

$$\mathcal{X}_i^{1,\mathcal{T}} = \begin{bmatrix} 0.05 & 0.04603517 & 0.02085527 & 0.01437835 & -0.0008886095 \\ -0.3964834 & -2.51799 & -0.6476911 & -1.526696 & -0.4973469 \\ -0.005862079 & 0.01547219 & 0.04064864 & 0.02317551 & 0.05031751 \\ 2.133427 & 2.517645 & -1.747313 & 2.7142 & 1.313696 \end{bmatrix}$$

$$\mathcal{N}_i^{0,\mathcal{T}} = \begin{bmatrix} -0.05 & -0.0495 & -0.04903965 & -0.0488311 & -0.04868731 \\ 0.05 & 0.04603517 & 0.02085527 & 0.01437835 & -0.0008886095 \\ -0.0025 & -0.002278741 & -0.001022735 & -0.0007021108 & 0.00004326401 \\ -0.0486962 & -0.04875482 & -0.0486001 & -0.04819361 & -0.04796186 \\ -0.005862079 & 0.01547219 & 0.04064864 & 0.02317551 & 0.05031751 \\ 0.0002854609 & -0.0007543439 & -0.001975528 & -0.001116912 & -0.002413321 \end{bmatrix}$$

Designed matrices via SOSTOOLS.

$$P_i = \begin{bmatrix} 0.3595527 & 0.2566636 & -0.008765747 \\ 0.2566636 & 0.7448531 & 0.2743625 \\ -0.008765747 & 0.2743625 & 6.116272 \end{bmatrix}$$

$$\mathcal{H}_i(x_i) = \begin{bmatrix} 1.774 \times 10^{-5}x_{i1} - 6.0428 \times 10^{-5}x_{i2} - 3.5577 \\ -1.3855 \times 10^{-5}x_{i1} + 4.7197 \times 10^{-5}x_{i2} - 5.0489 \\ -9.7792 \times 10^{-6}x_{i1} + 3.3312 \times 10^{-5}x_{i2} - 8.8196 \\ -2.8617 \times 10^{-5}x_{i1} + 9.7482 \times 10^{-5}x_{i2} - 10.5384 \\ -1.6162 \times 10^{-5}x_{i1} + 5.5055 \times 10^{-5}x_{i2} - 12.6278 \\ 1.3383 \times 10^{-5}x_{i1} - 4.559 \times 10^{-5}x_{i2} - 12.3679 \\ 2.5499 \times 10^{-5}x_{i1} - 8.686 \times 10^{-5}x_{i2} - 8.286 \\ -2.612 \times 10^{-5}x_{i1} + 8.8976 \times 10^{-5}x_{i2} - 5.8429 \\ 3.0305 \times 10^{-5}x_{i1} - 0.00010323x_{i2} - 6.5375 \\ 7.8551 \times 10^{-6}x_{i1} - 2.6758 \times 10^{-5}x_{i2} - 2.4563 \\ 0.00077264x_{i1} + 0.00031006x_{i2} - 65.9658 \\ -0.00060346x_{i1} - 0.00024217x_{i2} + 11.58 \\ -0.00042593x_{i1} - 0.00017093x_{i2} + 15.9943 \\ -0.0012464x_{i1} - 0.00050019x_{i2} + 49.4072 \\ -0.00070394x_{i1} - 0.00028249x_{i2} + 20.3594 \\ 0.00058291x_{i1} + 0.00023392x_{i2} - 33.8209 \\ 0.0011106x_{i1} + 0.00044568x_{i2} - 42.7507 \\ -0.0011376x_{i1} - 0.00045654x_{i2} + 66.182 \\ 0.0013199x_{i1} + 0.00052969x_{i2} - 35.1523 \\ 0.00034213x_{i1} + 0.0001373x_{i2} + 42.7143 \\ -26.7483x_{i1} - 0.24889x_{i2} - 1516.3734 \\ 20.8916x_{i1} + 0.19439x_{i2} - 442.2819 \\ 14.7455x_{i1} + 0.1372x_{i2} + 56.0813 \\ 43.15x_{i1} + 0.4015x_{i2} + 364.0945 \\ 24.3699x_{i1} + 0.22676x_{i2} + 130.1881 \\ -20.18x_{i1} - 0.18777x_{i2} - 272.8889 \\ -38.448x_{i1} - 0.35775x_{i2} - 259.9865 \\ 39.3846x_{i1} + 0.36646x_{i2} + 710.2816 \\ -45.6951x_{i1} - 0.42518x_{i2} + 70.2276 \\ -11.8442x_{i1} - 0.11021x_{i2} + 1226.8078 \end{bmatrix}$$

1.6. Duffing oscillator network with binary interconnection topology.

Collected data.

$$\begin{aligned}
\mathcal{U}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.165956 & -0.7064882 & -0.2064651 & -0.5910955 & -0.1653904 \\ 0.6014891 & 0.7527783 & -0.6603392 & 0.9157791 & 0.3730019 \end{bmatrix} \\
\mathcal{W}_i^{0,\mathcal{T}} &= \begin{bmatrix} 0.35252 & -0.65226 & 0.062107 & 0.60499 & 0.093904 \\ -0.79982 & -0.50198 & -0.12929 & -0.75618 & -0.57538 \\ -3.1635 & -1.5088 & 2.6027 & 2.029 & -11.27 \\ 0.74922 & 0.63137 & 0.60503 & 0.053064 & 0.5354 \\ -0.29852 & -0.66393 & -0.64265 & 0.307 & -0.77074 \\ 2.9137 & -40.115 & -0.20112 & -2.5718 & 6.4111 \end{bmatrix} \\
\mathcal{X}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.05 & -0.0495 & -0.04903965 & -0.0488311 & -0.04868731 \\ 0.05 & 0.04603517 & 0.02085527 & 0.01437835 & -0.0008886095 \\ -0.0486962 & -0.04875482 & -0.0486001 & -0.04819361 & -0.04796186 \\ -0.005862079 & 0.01547219 & 0.04064864 & 0.02317551 & 0.05031751 \end{bmatrix} \\
\mathcal{X}_i^{1,\mathcal{T}} &= \begin{bmatrix} 0.05 & 0.04603517 & 0.02085527 & 0.01437835 & -0.0008886095 \\ -0.3964834 & -2.51799 & -0.6476911 & -1.526696 & -0.4973469 \\ -0.005862079 & 0.01547219 & 0.04064864 & 0.02317551 & 0.05031751 \\ 2.133427 & 2.517645 & -1.747313 & 2.7142 & 1.313696 \end{bmatrix} \\
\mathcal{N}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.05 & -0.0495 & -0.04903965 & -0.0488311 & -0.04868731 \\ 0.05 & 0.04603517 & 0.02085527 & 0.01437835 & -0.0008886095 \\ -0.0025 & -0.002278741 & -0.001022735 & -0.0007021108 & 0.00004326401 \\ -0.0486962 & -0.04875482 & -0.0486001 & -0.04819361 & -0.04796186 \\ -0.005862079 & 0.01547219 & 0.04064864 & 0.02317551 & 0.05031751 \\ 0.0002854609 & -0.0007543439 & -0.001975528 & -0.001116912 & -0.002413321 \end{bmatrix}
\end{aligned}$$

Designed matrices via SOSTOOLS.

$$\begin{aligned}
P_i &= \begin{bmatrix} 0.3626366 & 0.2306686 & -0.007930215 \\ 0.2306686 & 0.6991668 & 0.2760315 \\ -0.007930215 & 0.2760315 & 6.121129 \end{bmatrix} \\
\mathcal{H}_i(x_i) &= \begin{bmatrix} 2.2414 \times 10^{-5}x_{i1} - 7.4775 \times 10^{-5}x_{i2} - 3.0244 \\ -1.7506 \times 10^{-5}x_{i1} + 5.8403 \times 10^{-5}x_{i2} - 4.6044 \\ -1.2356 \times 10^{-5}x_{i1} + 4.1221 \times 10^{-5}x_{i2} - 8.4541 \\ -3.6158 \times 10^{-5}x_{i1} + 0.00012063x_{i2} - 10.2554 \\ -2.0421 \times 10^{-5}x_{i1} + 6.8127 \times 10^{-5}x_{i2} - 12.3773 \\ 1.691 \times 10^{-5}x_{i1} - 5.6414 \times 10^{-5}x_{i2} - 12.0524 \\ 3.2218 \times 10^{-5}x_{i1} - 0.00010748x_{i2} - 7.8362 \\ -3.3003 \times 10^{-5}x_{i1} + 0.0001101x_{i2} - 5.4268 \\ 3.8291 \times 10^{-5}x_{i1} - 0.00012774x_{i2} - 6.0294 \\ 9.925 \times 10^{-6}x_{i1} - 3.3111 \times 10^{-5}x_{i2} - 1.867 \end{bmatrix}
\end{aligned}$$

$$\begin{aligned}
& 0.00073022x_{i1} + 0.00029736x_{i2} - 65.5002 \\
& -0.00057033x_{i1} - 0.00023225x_{i2} + 11.4027 \\
& -0.00040254x_{i1} - 0.00016392x_{i2} + 15.3961 \\
& -0.001178x_{i1} - 0.0004797x_{i2} + 48.2516 \\
& -0.00066529x_{i1} - 0.00027092x_{i2} + 19.0798 \\
& 0.0005509x_{i1} + 0.00022434x_{i2} - 34.5842 \\
& 0.0010496x_{i1} + 0.00042742x_{i2} - 42.6785 \\
& -0.0010752x_{i1} - 0.00043784x_{i2} + 65.8244 \\
& 0.0012475x_{i1} + 0.00050799x_{i2} - 34.6895 \\
& 0.00032334x_{i1} + 0.00013167x_{i2} + 43.5531 \\
& -26.5686x_{i1} - 0.2166x_{i2} - 1515.1905 \\
& 20.7512x_{i1} + 0.16917x_{i2} - 441.9102 \\
& 14.6464x_{i1} + 0.1194x_{i2} + 56.0713 \\
& 42.8601x_{i1} + 0.34941x_{i2} + 363.8761 \\
& 24.2062x_{i1} + 0.19734x_{i2} + 130.156 \\
& -20.0444x_{i1} - 0.16341x_{i2} - 272.6407 \\
& -38.1897x_{i1} - 0.31134x_{i2} - 259.7968 \\
& 39.12x_{i1} + 0.31892x_{i2} + 709.7449 \\
& -45.3881x_{i1} - 0.37002x_{i2} + 70.1302 \\
& -11.7646x_{i1} - 0.095909x_{i2} + 1225.7775
\end{aligned}$$

1.7. Chen network with fully-interconnected topology.

Collected data.

$$\begin{aligned}
\mathcal{U}_i^{0,\mathcal{T}} &= \begin{bmatrix} 0.0668088 & 0.2525201 & 0.01997813 & 0.2418845 & 0.231175 \\ -0.03402157 & -0.00925234 & -0.09209956 & 0.07883234 & 0.25471 \end{bmatrix} \\
\mathcal{X}_i^{0,\mathcal{T}} &= \begin{bmatrix} 0.18 & 0.178622 & 0.1954769 & 0.2260003 & 0.26105 \\ 0.18 & 0.2209323 & 0.2784562 & 0.3385397 & 0.4266388 \\ 0.18 & 0.1682102 & 0.1588346 & 0.1581104 & 0.1580719 \\ 0.3171288 & 0.3975929 & 0.4946057 & 0.6115088 & 0.7547534 \\ 0.5384334 & 0.6701494 & 0.8259628 & 1.012307 & 1.250477 \\ 0.1547537 & 0.1568046 & 0.1614947 & 0.1544001 & 0.156694 \end{bmatrix} \\
\mathcal{X}_i^{1,\mathcal{T}} &= \begin{bmatrix} -0.1377991 & 1.685484 & 3.052344 & 3.50497 & 5.607879 \\ 4.093233 & 5.752389 & 6.008344 & 8.809919 & 11.17945 \\ -1.178977 & -0.9375626 & -0.07242416 & -0.003847501 & -0.3318149 \\ 8.046407 & 9.70128 & 11.69032 & 14.32446 & 17.53351 \\ 13.17161 & 15.58134 & 18.6344 & 23.81706 & 29.53778 \\ 0.2050845 & 0.4690085 & -0.7094608 & 0.2293965 & 0.02496122 \end{bmatrix} \\
\mathcal{N}_i^{0,\mathcal{T}} &= \begin{bmatrix} 0.18 & 0.18 & 0.1933504 & 0.2197699 & 0.2585062 & 0.3114033 \\ 0.18 & 0.2181441 & 0.2688348 & 0.3304449 & 0.4096408 & 0.5081397 \\ 0.18 & 0.174924 & 0.1700689 & 0.1654867 & 0.1612483 & 0.1574698 \\ 0.0324 & 0.03148632 & 0.0328829 & 0.036369 & 0.04168368 & 0.04903661 \\ 0.0324 & 0.03926594 & 0.05197932 & 0.07262187 & 0.1058947 & 0.1582364 \\ 0.380261 & 0.4668961 & 0.5751782 & 0.7096265 \\ 0.62779 & 0.7762735 & 0.9593163 & 1.187581 \\ 0.1543281 & 0.1520855 & 0.1511473 & 0.1521306 \\ 0.05868494 & 0.07100811 & 0.08693662 & 0.1079559 \\ 0.238724 & 0.3624391 & 0.5517778 & 0.8427392 \end{bmatrix}
\end{aligned}$$

Designed matrices via SOSTOOLS.

$$P_i = \begin{bmatrix} 38.11277 & 0.03527685 & -0.07595653 & -0.1380076 & -0.3776485 \\ 0.03527685 & 37.26471 & -0.2164331 & 0.4039647 & 0.1073503 \\ -0.07595653 & -0.2164331 & 46.54241 & -11.07629 & -0.08078515 \\ -0.1380076 & 0.4039647 & -11.07629 & 14.393 & -0.1468607 \\ -0.3776485 & 0.1073503 & -0.08078515 & -0.1468607 & 0.8139579 \end{bmatrix}$$

$$\mathcal{H}_i(x_i) = \begin{bmatrix} -0.025725x_{i1} - 0.0010627x_{i2} - 0.0085102x_{i3} + 6.519 \\ 0.074484x_{i1} + 0.002748x_{i2} + 0.023934x_{i3} - 7.9346 \\ -0.050618x_{i1} - 0.00033024x_{i2} - 0.015027x_{i3} - 34.7937 \\ -0.059589x_{i1} - 0.0056519x_{i2} - 0.015422x_{i3} + 50.9555 \\ 0.16337x_{i1} + 0.01105x_{i2} + 0.035166x_{i3} + 15.3135 \\ -0.081861x_{i1} - 0.0037332x_{i2} - 0.019397x_{i3} - 35.0944 \\ -0.24443x_{i1} - 0.021768x_{i2} - 0.042251x_{i3} - 2.7335 \\ 0.4188x_{i1} + 0.034158x_{i2} + 0.080852x_{i3} - 0.65198 \\ -0.24407x_{i1} - 0.019207x_{i2} - 0.049959x_{i3} + 14.1373 \\ 0.049545x_{i1} + 0.0037842x_{i2} + 0.010598x_{i3} - 5.6475 \\ 0.0509x_{i1} + 0.025345x_{i2} + 0.0018525x_{i3} + 35.5736 \\ -0.14445x_{i1} - 0.073579x_{i2} - 0.0048766x_{i3} - 105.7327 \\ 0.085943x_{i1} + 0.05073x_{i2} + 0.0021159x_{i3} + 90.187 \\ 0.13844x_{i1} + 0.057832x_{i2} + 0.0031914x_{i3} + 6.0909 \\ -0.34174x_{i1} - 0.16098x_{i2} - 0.0034371x_{i3} - 45.9071 \\ 0.15917x_{i1} + 0.081219x_{i2} + 0.0020046x_{i3} + 62.9123 \\ 0.54266x_{i1} + 0.23972x_{i2} + 0.0016018x_{i3} - 79.7965 \\ -0.91256x_{i1} - 0.41121x_{i2} - 0.0060413x_{i3} + 34.0404 \\ 0.52866x_{i1} + 0.23966x_{i2} + 0.0047544x_{i3} + 9.1695 \\ -0.10679x_{i1} - 0.048655x_{i2} - 0.0011625x_{i3} - 6.6169 \\ -0.10849x_{i1} + 0.0021933x_{i2} + 0.025377x_{i3} + 3.1144 \\ 0.26843x_{i1} - 0.0065476x_{i2} - 0.073537x_{i3} + 17.4261 \\ -0.0357x_{i1} + 0.0060264x_{i2} + 0.050158x_{i3} - 47.3205 \\ -0.33383x_{i1} - 0.00037331x_{i2} + 0.058735x_{i3} - 16.3818 \\ 0.3766x_{i1} - 0.0024119x_{i2} - 0.16173x_{i3} + 103.6235 \\ -0.12103x_{i1} + 0.0040856x_{i2} + 0.081097x_{i3} - 39.2859 \\ -0.59144x_{i1} - 0.0063973x_{i2} + 0.24205x_{i3} - 136.8427 \\ 1.0692x_{i1} + 0.0042473x_{i2} - 0.41457x_{i3} + 231.0781 \\ -0.66646x_{i1} - 0.00067554x_{i2} + 0.24153x_{i3} - 151.5178 \\ 0.14209x_{i1} - 0.000155x_{i2} - 0.049016x_{i3} + 36.3504 \\ -15.8557x_{i1} + 0.044627x_{i2} + 9.823x_{i3} + 70.1395 \\ 46.7848x_{i1} - 0.13209x_{i2} - 14.1879x_{i3} - 93.5374 \\ -34.5668x_{i1} + 0.10155x_{i2} - 37.5468x_{i3} - 66.1135 \\ -35.3742x_{i1} + 0.084552x_{i2} + 56.1012x_{i3} + 42.4092 \\ 107.2675x_{i1} - 0.26876x_{i2} + 15.9235x_{i3} + 39.8373 \\ -54.9311x_{i1} + 0.14584x_{i2} - 32.9465x_{i3} + 46.7853 \\ -160.3961x_{i1} + 0.37394x_{i2} - 0.36316x_{i3} + 16.4801 \\ 273.44x_{i1} - 0.65577x_{i2} - 6.444x_{i3} - 29.9005 \\ -158.4358x_{i1} + 0.38475x_{i2} + 14.3153x_{i3} - 63.4946 \\ 32.0168x_{i1} - 0.078531x_{i2} - 4.5485x_{i3} + 38.0793 \end{bmatrix}$$

$$\begin{array}{l} 35.4x_{i_1} + 9.8557x_{i_2} + 0.017241x_{i_3} - 0.97462 \\ -103.9763x_{i_1} - 14.1968x_{i_2} - 0.047532x_{i_3} - 0.33549 \\ 89.2727x_{i_1} - 37.8219x_{i_2} + 0.028886x_{i_3} + 3.7222 \\ 4.4311x_{i_1} + 56.3602x_{i_2} + 0.021256x_{i_3} - 1.5344 \\ -45.9025x_{i_1} + 16.2324x_{i_2} - 0.035116x_{i_3} + 2.175 \\ 63.1713x_{i_1} - 33.2428x_{i_2} + 0.025719x_{i_3} + 3.9863 \\ -77.4685x_{i_1} - 0.7184x_{i_2} + 0.0094046x_{i_3} - 3.2528 \\ 32.355x_{i_1} - 5.9022x_{i_2} - 0.050414x_{i_3} - 4.5642 \\ 8.9319x_{i_1} + 14.0701x_{i_2} + 0.04061x_{i_3} - 8.1705 \\ -6.3164x_{i_1} - 4.5097x_{i_2} - 0.010049x_{i_3} + 8.6377 \end{array}$$