

1. COLLECTED DATA AND DESIGNED MATRICES

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

1.1. Lorenz network with fully-interconnected topology.

Designed matrices via SOSTOOLS.

$$\begin{aligned}
 \mathcal{X}_i^{11} &= \begin{bmatrix} -0.013 & -2.1e-7 & 9.7e-7 & 1.9e-6 & -4.0e-9 \\ -2.1e-7 & -0.013 & 2.5e-7 & 5.3e-8 & -2.4e-7 \\ 9.7e-7 & 2.5e-7 & -0.013 & -6.7e-7 & 4.4e-8 \\ 1.9e-6 & 5.3e-8 & -6.7e-7 & -0.012 & -1.6e-7 \\ -4.0e-9 & -2.4e-7 & 4.4e-8 & -1.6e-7 & -0.012 \end{bmatrix} \\
 \mathcal{X}_i^{22} &= \begin{bmatrix} -12.0 & 0.011 & -0.26 & -2.6e-3 & -4.2e-5 \\ 0.011 & -15.0 & -0.056 & -2.8e-3 & -3.1e-3 \\ -0.26 & -0.056 & -16.0 & 0.075 & 3.6e-4 \\ -2.6e-3 & -2.8e-3 & 0.075 & -0.083 & -2.3e-6 \\ -4.2e-5 & -3.1e-3 & 3.6e-4 & -2.3e-6 & -0.15 \end{bmatrix} \\
 \mathcal{X}_i^{12} &= \begin{bmatrix} -0.91 & 5.4e-4 & -9.8e-3 & -3.0e-4 & -9.6e-7 \\ 4.4e-4 & -0.92 & -1.9e-3 & -9.5e-5 & -1.6e-4 \\ -7.8e-3 & -1.8e-3 & -0.94 & 2.3e-3 & 1.6e-5 \\ -3.9e-3 & -1.4e-3 & 0.037 & -0.085 & -1.4e-5 \\ -1.6e-5 & -1.7e-6 & 8.0e-5 & -1.2e-5 & -0.11 \end{bmatrix}, \quad \mathcal{X}_i^{21} = (\mathcal{X}_i^{12})^\top \\
 P_i &= \begin{bmatrix} 32.0 & -0.014 & 0.32 & 0.01 & 3.3e-5 \\ -0.014 & 39.0 & 0.072 & 4.0e-3 & 7.9e-3 \\ 0.32 & 0.072 & 40.0 & -0.097 & -7.4e-4 \\ 0.01 & 4.0e-3 & -0.097 & 0.28 & 2.0e-5 \\ 3.3e-5 & 7.9e-3 & -7.4e-4 & 2.0e-5 & 0.37 \end{bmatrix}
 \end{aligned}$$

1.2. Lorenz network with ring interconnection topology.

Designed matrices via SOSTOOLS.

$$\begin{aligned}
 \mathcal{X}_i^{11} &= \begin{bmatrix} -2.33 & -6.94e-4 & -2.84e-4 & -3.12e-4 & 2.35e-5 \\ -6.94e-4 & -2.34 & -2.84e-4 & 1.87e-4 & 9.18e-5 \\ -2.84e-4 & -2.84e-4 & -2.31 & -1.2e-4 & -1.73e-4 \\ -3.12e-4 & 1.87e-4 & -1.2e-4 & -2.41 & -1.74e-4 \\ 2.35e-5 & 9.18e-5 & -1.73e-4 & -1.74e-4 & -2.42 \end{bmatrix} \\
 \mathcal{X}_i^{22} &= \begin{bmatrix} -0.253 & 0.133 & 0.0858 & 0.0874 & 0.00191 \\ 0.133 & -0.227 & -0.0471 & 0.0118 & 9.03e-4 \\ 0.0858 & -0.0471 & -0.84 & 0.0513 & -2.72e-4 \\ 0.0874 & 0.0118 & 0.0513 & -0.732 & -0.00512 \\ 0.00191 & 9.03e-4 & -2.72e-4 & -0.00512 & -0.00387 \end{bmatrix}
 \end{aligned}$$

$$\mathcal{X}_i^{12} = \begin{bmatrix} -2.33 & -6.94e-4 & -2.84e-4 & -3.12e-4 & 2.35e-5 \\ -6.94e-4 & -2.34 & -2.84e-4 & 1.87e-4 & 9.18e-5 \\ -2.84e-4 & -2.84e-4 & -2.31 & -1.2e-4 & -1.73e-4 \\ -3.12e-4 & 1.87e-4 & -1.2e-4 & -2.41 & -1.74e-4 \\ 2.35e-5 & 9.18e-5 & -1.73e-4 & -1.74e-4 & -2.42 \end{bmatrix}, \quad \mathcal{X}_i^{21} = (\mathcal{X}_i^{12})^\top$$

$$P_i = \begin{bmatrix} 0.31 & -0.093 & -0.039 & -9.4e-3 & -1.2e-3 \\ -0.093 & 0.31 & 0.018 & -1.6e-3 & -8.1e-4 \\ -0.039 & 0.018 & 0.55 & -5.1e-3 & 3.0e-4 \\ -9.4e-3 & -1.6e-3 & -5.1e-3 & 0.085 & 5.6e-4 \\ -1.2e-3 & -8.1e-4 & 3.0e-4 & 5.6e-4 & 6.4e-3 \end{bmatrix}$$

1.3. Spacecraft network with binary interconnection topology.

Collected data.

$$\mathcal{U}_i^{0,\mathcal{T}} = \begin{bmatrix} -1.6596 & -6.2748 & -5.911 & -7.1923 & 7.5278 & -8.0331 \\ 4.4065 & -3.0888 & 7.5623 & -6.038 & 7.8921 & -1.5778 \\ -9.9977 & -2.0647 & -9.4522 & 6.0149 & -8.2991 & 9.1578 \\ 3.73 & -4.3911 & -4.2445 & -0.16854 \\ 6.6925 & 5.7856 & -7.3994 & -8.9327 \\ -9.6342 & -7.9355 & -9.6127 & 1.4824 \end{bmatrix}$$

$$\mathcal{W}_i^{0,\mathcal{T}} = \begin{bmatrix} -0.39533 & 0.077633 & 0.34094 & 0.93652 & -0.92189 \\ -1.413 & -0.32322 & -0.33078 & -0.7463 & -1.3207 \\ -2.446 & 1.1113 & 0.35214 & 1.1539 & 2.2689 \\ 0.066331 & 0.50029 & -0.10421 & 0.35767 & -0.70654 \\ 0.76751 & 1.9554 & 1.6344 & -1.1535 & 0.35722 \\ -1.1069 & 1.489 & -1.2383 & -1.4067 & 1.1986 \end{bmatrix}$$

$$\mathcal{X}_i^{0,\mathcal{T}} = \begin{bmatrix} -0.05 & -0.060299 & -0.091183 & -0.11895 & -0.14995 & -0.11682 \\ 0.05 & 0.064943 & 0.047977 & 0.084293 & 0.050758 & 0.083924 \\ 0.01 & -0.031479 & -0.034657 & -0.06499 & -0.041094 & -0.061195 \\ -0.1564 & -0.13511 & -0.1572 & -0.1759 \\ 0.08023 & 0.12374 & 0.16125 & 0.11921 \\ -0.034359 & -0.06151 & -0.092089 & -0.12882 \end{bmatrix}$$

$$\mathcal{X}_i^{1,\mathcal{T}} = \begin{bmatrix} -0.10299 & -0.30884 & -0.27767 & -0.31005 & 0.33134 & -0.39577 \\ 0.14943 & -0.16965 & 0.36316 & -0.33535 & 0.33165 & -0.036943 \\ -0.41479 & -0.031778 & -0.30334 & 0.23896 & -0.20101 & 0.26836 \\ 0.21289 & -0.22096 & -0.18692 & -0.036075 \\ 0.43508 & 0.37515 & -0.42041 & -0.41745 \\ -0.27151 & -0.30579 & -0.36731 & 0.089363 \end{bmatrix}$$

$$\mathcal{N}_i^{0,\mathcal{T}} = \begin{bmatrix} 0.0005 & -0.0020443 & -0.0016627 & -0.0054783 & -0.0020859 & -0.0051357 \\ -0.0005 & 0.0018982 & 0.0031601 & 0.0077306 & 0.0061623 & 0.0071489 \\ -0.0025 & -0.003916 & -0.0043747 & -0.010027 & -0.0076115 & -0.0098041 \\ -0.0027566 & -0.0076111 & -0.01485 & -0.015357 \\ 0.0053737 & 0.0083105 & 0.014477 & 0.022659 \\ -0.012548 & -0.016718 & -0.02535 & -0.020969 \end{bmatrix}$$

Designed matrices via SOSTOOLS.

$$\begin{aligned}
 \mathcal{X}_i^{11} &= \begin{bmatrix} -0.35 & 3.15e-4 & 5.6e-4 \\ 3.15e-4 & -0.351 & 0.00184 \\ 5.6e-4 & 0.00184 & -0.378 \end{bmatrix}, & \mathcal{X}_i^{22} &= \begin{bmatrix} -25.4 & -9.06 & 6.58 \\ -9.06 & -5.86 & 0.411 \\ 6.58 & 0.411 & -3.42 \end{bmatrix} \\
 \mathcal{X}_i^{12} &= \begin{bmatrix} -30.1 & -9.25 & 7.67 \\ -9.44 & -12.1 & -2.42 \\ 8.12 & -2.27 & -8.8 \end{bmatrix}, & \mathcal{X}_i^{21} &= (\mathcal{X}_i^{12})^\top \\
 P_i &= \begin{bmatrix} 0.1152 & 0.035643 & -0.029137 \\ 0.035643 & 0.046412 & 0.0098026 \\ -0.029137 & 0.0098026 & 0.033438 \end{bmatrix} \\
 \mathcal{H}_i(x_i) &= \begin{bmatrix} 29.0635x_{i1} + 918.3778x_{i2} + 557.5603x_{i3} + 817.0359 \\ 38.2744x_{i1} + 765.3356x_{i2} + 863.2285x_{i3} + 913.477 \\ 42.5119x_{i1} + 640.2263x_{i2} - 605.6207x_{i3} - 298.9705 \\ 24.8067x_{i1} - 29.1806x_{i2} + 820.1901x_{i3} + 1097.4677 \\ -21.2984x_{i1} - 15.3271x_{i2} - 231.2024x_{i3} + 100.4214 \\ 4.7071x_{i1} - 1107.9799x_{i2} - 562.812x_{i3} - 117.6156 \\ -11.0615x_{i1} + 62.7583x_{i2} + 569.4996x_{i3} + 1160.0554 \\ -8.4624x_{i1} - 616.3418x_{i2} - 1157.9575x_{i3} - 1171.9517 \\ -9.6919x_{i1} + 287.1499x_{i2} + 282.9072x_{i3} - 857.0775 \\ -0.73086x_{i1} + 258.2624x_{i2} + 93.9581x_{i3} - 675.0357 \\ 903.9456x_{i1} + 21.293x_{i2} + 424.3202x_{i3} + 102.6579 \\ 742.3319x_{i1} + 30.3468x_{i2} + 611.805x_{i3} + 59.6163 \\ 676.6575x_{i1} - 0.43421x_{i2} + 813.3188x_{i3} + 961.8888 \\ -53.0691x_{i1} + 24.7402x_{i2} + 451.9809x_{i3} + 462.7967 \\ -13.3066x_{i1} - 11.0336x_{i2} - 414.096x_{i3} + 997.8239 \\ -1081.6238x_{i1} - 12.094x_{i2} + 286.8305x_{i3} + 309.2654 \\ 36.5394x_{i1} + 9.2944x_{i2} - 271.0102x_{i3} + 88.2025 \\ -572.1748x_{i1} - 28.165x_{i2} - 8.5177x_{i3} - 351.172 \\ 272.109x_{i1} + 3.7161x_{i2} - 255.2202x_{i3} - 1077.9513 \\ 253.7041x_{i1} + 2.1154x_{i2} - 56.9427x_{i3} + 2157.2173 \\ 521.4472x_{i1} + 416.9114x_{i2} + 13.3301x_{i3} + 288.2782 \\ 833.6547x_{i1} + 610.3778x_{i2} + 15.6795x_{i3} + 243.6148 \\ -629.2556x_{i1} + 799.9723x_{i2} + 11.1817x_{i3} + 1091.5654 \\ 822.2442x_{i1} + 461.9519x_{i2} + 8.3006x_{i3} - 786.9027 \\ -231.5338x_{i1} - 417.4447x_{i2} - 5.7795x_{i3} - 574.7718 \\ -517.3202x_{i1} + 299.3699x_{i2} - 6.4972x_{i3} - 1066.5846 \\ 566.1512x_{i1} - 267.2178x_{i2} - 0.36665x_{i3} - 1589.4326 \\ -1132.829x_{i1} - 10.4096x_{i2} - 8.9638x_{i3} - 753.35 \\ 270.6371x_{i1} - 257.6875x_{i2} + 0.16994x_{i3} - 751.5803 \\ 83.3888x_{i1} - 60.2017x_{i2} + 1.4769x_{i3} + 267.1943 \end{bmatrix}
 \end{aligned}$$

1.4. Spacecraft network with star interconnection topology.

Collected data.

$$\begin{aligned}
U_i^{0,\mathcal{T}} &= \begin{bmatrix} -1.6596 & -6.2748 & -5.911 & -7.1923 & 7.5278 & -8.0331 \\ 4.4065 & -3.0888 & 7.5623 & -6.038 & 7.8921 & -1.5778 \\ -9.9977 & -2.0647 & -9.4522 & 6.0149 & -8.2991 & 9.1578 \\ 3.73 & -4.3911 & -4.2445 & -0.16854 & & \\ 6.6925 & 5.7856 & -7.3994 & -8.9327 & & \\ -9.6342 & -7.9355 & -9.6127 & 1.4824 & & \end{bmatrix} \\
W_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.39533 & 0.077633 & 0.34094 & 0.93652 & -0.92189 & \\ -1.413 & -0.32322 & -0.33078 & -0.7463 & -1.3207 & \\ -2.446 & 1.1113 & 0.35214 & 1.1539 & 2.2689 & \\ 0.066331 & 0.50029 & -0.10421 & 0.35767 & -0.70654 & \\ 0.76751 & 1.9554 & 1.6344 & -1.1535 & 0.35722 & \\ -1.1069 & 1.489 & -1.2383 & -1.4067 & 1.1986 & \end{bmatrix} \\
\mathcal{X}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.05 & -0.05103 & -0.05413 & -0.056916 & -0.060045 & -0.056743 \\ 0.05 & 0.051494 & 0.049787 & 0.053401 & 0.050008 & 0.053292 \\ 0.01 & 0.0058521 & 0.0055343 & 0.002501 & 0.0048906 & 0.0028805 \\ -0.060727 & -0.058614 & -0.060862 & -0.062806 & & \\ 0.052886 & 0.057209 & 0.060918 & 0.056642 & & \\ 0.0055641 & 0.002849 & -0.0002089 & -0.003882 & & \end{bmatrix} \\
\mathcal{X}_i^{1,\mathcal{T}} &= \begin{bmatrix} -0.10299 & -0.31001 & -0.27864 & -0.31285 & 0.33017 & -0.39841 \\ 0.14943 & -0.17075 & 0.36143 & -0.33928 & 0.32843 & -0.040599 \\ -0.41479 & -0.031778 & -0.30334 & 0.23896 & -0.20101 & 0.26836 \\ 0.21137 & -0.22485 & -0.19433 & -0.043644 & & \\ 0.43223 & 0.37091 & -0.42764 & -0.42865 & & \\ -0.27151 & -0.30579 & -0.36731 & 0.089363 & & \end{bmatrix} \\
\mathcal{N}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.05 & -0.05103 & -0.05413 & -0.05692 & -0.06004 & -0.05674 \\ 0.05 & 0.05149 & 0.04979 & 0.0534 & 0.05001 & 0.05329 \\ 0.01 & 0.005852 & 0.005534 & 0.002501 & 0.004891 & 0.00288 \\ -0.06073 & -0.05861 & -0.06086 & -0.06281 & & \\ 0.05289 & 0.05721 & 0.06092 & 0.05664 & & \\ 0.005564 & 0.002849 & -0.0002089 & -0.003882 & & \end{bmatrix}
\end{aligned}$$

Designed matrices via SOSTOOLS.

$$\begin{aligned}
\mathcal{X}_i^{11} &= \begin{bmatrix} -0.53 & -0.0158 & -2.45e-4 \\ -0.0158 & -0.538 & 0.00238 \\ -2.45e-4 & 0.00238 & -0.569 \end{bmatrix}, \quad \mathcal{X}_i^{22} = \begin{bmatrix} -0.426 & -0.457 & 0.408 \\ -0.457 & -0.5 & 0.423 \\ 0.408 & 0.423 & -1.04 \end{bmatrix} \\
\mathcal{X}_i^{12} &= \begin{bmatrix} -0.823 & -0.769 & 0.412 \\ -0.788 & -0.985 & 0.462 \\ 0.406 & 0.397 & -1.82 \end{bmatrix}, \quad \mathcal{X}_i^{21} = (\mathcal{X}_i^{12})^\top \\
P_i &= \begin{bmatrix} 0.01469 & 0.01354 & -0.005888 \\ 0.01354 & 0.01727 & -0.005447 \\ -0.005888 & -0.005447 & 0.03425 \end{bmatrix}
\end{aligned}$$

$$\mathcal{H}_i(x_i) = \left[\begin{array}{l} -2.0492 \times 10^{-9}x_{i1} - 2.0104 \times 10^{-9}x_{i2} + 1.3091 \times 10^{-8}x_{i3} + 954.962 \\ -1.2393 \times 10^{-10}x_{i1} - 1.1872 \times 10^{-10}x_{i2} + 8.4968 \times 10^{-10}x_{i3} + 961.6232 \\ 6.0433 \times 10^{-9}x_{i1} + 5.957 \times 10^{-9}x_{i2} - 3.6602 \times 10^{-8}x_{i3} + 1654.9928 \\ 1.9696 \times 10^{-9}x_{i1} + 1.9349 \times 10^{-9}x_{i2} - 1.2702 \times 10^{-8}x_{i3} - 380.9307 \\ -2.1136 \times 10^{-9}x_{i1} - 2.0778 \times 10^{-9}x_{i2} + 1.3284 \times 10^{-8}x_{i3} - 3223.4539 \\ -9.5021 \times 10^{-10}x_{i1} - 9.6919 \times 10^{-10}x_{i2} + 3.3215 \times 10^{-9}x_{i3} + 29.0251 \\ -3.7108 \times 10^{-11}x_{i1} - 2.7514 \times 10^{-11}x_{i2} + 9.1004 \times 10^{-10}x_{i3} - 1818.0146 \\ -2.4135 \times 10^{-9}x_{i1} - 2.3979 \times 10^{-9}x_{i2} + 1.3658 \times 10^{-8}x_{i3} + 1141.329 \\ 7.424 \times 10^{-10}x_{i1} + 7.5496 \times 10^{-10}x_{i2} - 2.7813 \times 10^{-9}x_{i3} + 142.6305 \\ -8.1327 \times 10^{-10}x_{i1} - 7.9553 \times 10^{-10}x_{i2} + 5.3141 \times 10^{-9}x_{i3} - 2998.1192 \\ \\ 1.0602 \times 10^{-9}x_{i1} + 9.8406 \times 10^{-10}x_{i2} - 6.0302 \times 10^{-9}x_{i3} + 1339.8068 \\ 2.5361 \times 10^{-9}x_{i1} + 2.4147 \times 10^{-9}x_{i2} - 1.4516 \times 10^{-8}x_{i3} + 1572.5914 \\ -4.8306 \times 10^{-11}x_{i1} + 5.6927 \times 10^{-11}x_{i2} + 6.8915 \times 10^{-10}x_{i3} - 1021.6053 \\ 3.6664 \times 10^{-9}x_{i1} + 3.515 \times 10^{-9}x_{i2} - 2.1088 \times 10^{-8}x_{i3} + 319.6879 \\ -5.5452 \times 10^{-10}x_{i1} - 5.5759 \times 10^{-10}x_{i2} + 3.1651 \times 10^{-9}x_{i3} - 1081.8789 \\ -2.1056 \times 10^{-9}x_{i1} - 2.0547 \times 10^{-9}x_{i2} + 1.1338 \times 10^{-8}x_{i3} - 1189.9148 \\ 4.7726 \times 10^{-10}x_{i1} + 4.6323 \times 10^{-10}x_{i2} - 2.5508 \times 10^{-9}x_{i3} - 499.8219 \\ -7.8512 \times 10^{-9}x_{i1} - 7.5319 \times 10^{-9}x_{i2} + 4.4568 \times 10^{-8}x_{i3} - 333.3324 \\ 1.7528 \times 10^{-9}x_{i1} + 1.7054 \times 10^{-9}x_{i2} - 9.527 \times 10^{-9}x_{i3} + 3148.5258 \\ 1.4141 \times 10^{-9}x_{i1} + 1.3382 \times 10^{-9}x_{i2} - 8.0533 \times 10^{-9}x_{i3} + 1161.1264 \\ \\ -4.8123 \times 10^{-10}x_{i1} - 4.8469 \times 10^{-10}x_{i2} + 3.3029 \times 10^{-9}x_{i3} + 2032.5934 \\ -1.9268 \times 10^{-10}x_{i1} - 2.2857 \times 10^{-10}x_{i2} + 6.4273 \times 10^{-10}x_{i3} + 756.6893 \\ 4.8879 \times 10^{-9}x_{i1} + 4.8835 \times 10^{-9}x_{i2} - 2.7247 \times 10^{-8}x_{i3} + 1251.2388 \\ -2.8535 \times 10^{-10}x_{i1} - 3.5321 \times 10^{-10}x_{i2} - 1.8192 \times 10^{-10}x_{i3} - 966.5005 \\ -7.2958 \times 10^{-10}x_{i1} - 7.1215 \times 10^{-10}x_{i2} + 4.7944 \times 10^{-9}x_{i3} - 28.2425 \\ -5.161 \times 10^{-9}x_{i1} - 5.1667 \times 10^{-9}x_{i2} + 2.6192 \times 10^{-8}x_{i3} - 2299.5371 \\ 1.22 \times 10^{-9}x_{i1} + 1.2236 \times 10^{-9}x_{i2} - 6.0491 \times 10^{-9}x_{i3} + 673.5638 \\ -2.9053 \times 10^{-9}x_{i1} - 2.802 \times 10^{-9}x_{i2} + 1.672 \times 10^{-8}x_{i3} - 475.8627 \\ 3.6663 \times 10^{-9}x_{i1} + 3.6663 \times 10^{-9}x_{i2} - 1.868 \times 10^{-8}x_{i3} + 1015.2693 \\ -7.5167 \times 10^{-11}x_{i1} - 8.9401 \times 10^{-11}x_{i2} + 5.961 \times 10^{-10}x_{i3} - 1720.1574 \end{array} \right]$$

1.5. Chen network with line interconnection topology.

Collected data.

$$\mathcal{U}_i^{0,T} = \begin{bmatrix} 0.66809 & -0.25496 & -0.18219 & -0.43845 & 2.5056 & -0.60661 \\ 1.746 & 0.12178 & 0.1511 & 0.96629 & & \end{bmatrix}$$

$$\mathcal{W}_i^{0,T} = \begin{bmatrix} 0.44065 & -0.30888 & 0.75623 & -0.6038 & 0.78921 \\ -1.9995 & -0.41293 & -1.8904 & 1.203 & -1.6598 \\ -1.186 & 0.2329 & 1.0228 & 2.8096 & -2.7657 \\ -1.413 & -0.32322 & -0.33078 & -0.7463 & -1.3207 \\ -2.446 & 1.1113 & 0.35214 & 1.1539 & 2.2689 \\ \\ -0.15778 & 0.66925 & 0.57856 & -0.73994 & -0.89327 \\ 1.8316 & -1.9268 & -1.5871 & -1.9225 & 0.29647 \\ 0.19899 & 1.5009 & -0.31264 & 1.073 & -2.1196 \\ 0.76751 & 1.9554 & 1.6344 & -1.1535 & 0.35722 \\ -1.1069 & 1.489 & -1.2383 & -1.4067 & 1.1986 \end{bmatrix}$$

$$\begin{aligned}
\mathcal{X}_i^{0,\mathcal{T}} &= \begin{bmatrix} 0.2 & 0.19996 & 0.21697 & 0.24636 & 0.28908 & 0.34503 \\ 0.2 & 0.24848 & 0.30116 & 0.36826 & 0.44916 & 0.5794 \\ 0.2 & 0.19452 & 0.18916 & 0.18403 & 0.17914 & 0.17534 \\ 0.42708 & 0.52625 & 0.65582 & 0.81532 \\ 0.71062 & 0.89662 & 1.1113 & 1.3772 \\ 0.17206 & 0.16978 & 0.16944 & 0.17154 \end{bmatrix} \\
\mathcal{X}_i^{1,\mathcal{T}} &= \begin{bmatrix} -0.0044065 & 1.7015 & 2.9391 & 4.2723 & 5.5949 & 8.2043 \\ 4.8481 & 5.268 & 6.7094 & 8.0908 & 13.023 & 13.122 \\ -0.54814 & -0.5362 & -0.51235 & -0.48947 & -0.37991 & -0.3281 \\ 9.9174 & 12.957 & 15.95 & 19.674 \\ 18.6 & 21.47 & 26.585 & 33.677 \\ -0.22769 & -0.034373 & 0.20978 & 0.62942 \end{bmatrix} \\
\mathcal{N}_i^{0,\mathcal{T}} &= \begin{bmatrix} 0.2 & 0.2 & 0.2169 & 0.24629 & 0.28878 & 0.3447 \\ 0.2 & 0.24828 & 0.30086 & 0.36769 & 0.44856 & 0.57848 \\ 0.2 & 0.1944 & 0.18906 & 0.18405 & 0.17943 & 0.17535 \\ 0.04 & 0.03888 & 0.041008 & 0.045328 & 0.051816 & 0.060443 \\ 0.04 & 0.049656 & 0.065256 & 0.090556 & 0.12953 & 0.1994 \\ 0.42652 & 0.52562 & 0.65498 & 0.81404 \\ 0.70966 & 0.89523 & 1.1094 & 1.3746 \\ 0.17209 & 0.16996 & 0.16958 & 0.17178 \\ 0.073399 & 0.089334 & 0.11107 & 0.13984 \\ 0.30269 & 0.47055 & 0.72666 & 1.119 \end{bmatrix}
\end{aligned}$$

Designed matrices via SOSTOOLS.

$$\begin{aligned}
\mathcal{X}_i^{11} &= \begin{bmatrix} -1.04 & -1.21e-4 & 1.21e-5 & 1.32e-4 & -3.56e-5 \\ -1.21e-4 & -1.04 & -3.98e-5 & 0.0025 & 2.33e-4 \\ 1.21e-5 & -3.98e-5 & -1.04 & 8.03e-5 & 1.87e-4 \\ 1.32e-4 & 0.0025 & 8.03e-5 & -1.05 & 1.4e-4 \\ -3.56e-5 & 2.33e-4 & 1.87e-4 & 1.4e-4 & -1.03 \end{bmatrix} \\
\mathcal{X}_i^{22} &= \begin{bmatrix} -0.419 & 0.264 & -0.104 & 0.383 & -0.0421 \\ 0.264 & -0.59 & 0.102 & 0.413 & 0.036 \\ -0.104 & 0.102 & -0.309 & 0.184 & -0.0645 \\ 0.383 & 0.413 & 0.184 & -6.33 & 0.0505 \\ -0.0421 & 0.036 & -0.0645 & 0.0505 & -0.0217 \end{bmatrix} \\
\mathcal{X}_i^{12} &= \begin{bmatrix} -1.19 & 0.444 & -0.058 & 0.0282 & -0.0406 \\ 0.4 & -1.43 & 0.101 & -0.00506 & 0.0342 \\ -0.0514 & 0.0999 & -0.901 & 0.0164 & -0.0717 \\ 0.328 & 0.354 & 0.161 & -5.46 & 0.0452 \\ -0.401 & 0.37 & -0.777 & 0.0215 & -0.329 \end{bmatrix} \quad \mathcal{X}_i^{21} = (\mathcal{X}_i^{12})^\top \\
P_i &= \begin{bmatrix} 0.53786 & -0.18453 & 0.025904 & -0.012831 & 0.01807 \\ -0.18453 & 0.71658 & -0.049454 & -0.022034 & -0.016426 \\ 0.025904 & -0.049454 & 0.43996 & -0.0065823 & 0.034716 \\ -0.012831 & -0.022034 & -0.0065823 & 0.24229 & -0.0018902 \\ 0.01807 & -0.016426 & 0.034716 & -0.0018902 & 0.015085 \end{bmatrix}
\end{aligned}$$

$$\mathcal{H}_i(x_i) = \left[\begin{array}{l} 2.1815x_{i1} + 16.9232x_{i2} + 0.74135x_{i3} - 235.0871 \\ -4.3418x_{i1} - 34.6408x_{i2} - 1.746x_{i3} + 444.2527 \\ 1.8477x_{i1} + 21.2313x_{i2} + 3.4991x_{i3} + 367.6977 \\ -1.5713x_{i1} - 18.8984x_{i2} - 3.2946x_{i3} - 342.8025 \\ 5.2529x_{i1} + 40.1966x_{i2} + 1.1316x_{i3} - 646.1807 \\ -0.020736x_{i1} - 0.95066x_{i2} - 0.18224x_{i3} - 191.6597 \\ -9.7879x_{i1} - 75.4845x_{i2} - 2.9386x_{i3} + 1014.3943 \\ 8.6435x_{i1} + 71.5693x_{i2} + 4.6855x_{i3} - 498.6715 \\ -2.1646x_{i1} - 20.4008x_{i2} - 2.1792x_{i3} + 132.2737 \\ -0.051686x_{i1} + 0.3103x_{i2} + 0.25475x_{i3} - 48.618 \\ \\ 220.7936x_{i1} + 0.29035x_{i2} - 3.2095x_{i3} + 150.7637 \\ -442.6531x_{i1} - 0.7819x_{i2} + 6.6993x_{i3} - 259.0307 \\ 170.328x_{i1} + 2.1442x_{i2} - 5.5853x_{i3} + 1974.579 \\ -144.1868x_{i1} - 2.0405x_{i2} + 5.0785x_{i3} - 1881.0453 \\ 551.1875x_{i1} + 0.34999x_{i2} - 7.212x_{i3} - 794.2198 \\ -6.7907x_{i1} - 0.14867x_{i2} + 0.25489x_{i3} + 196.3224 \\ -1000.4119x_{i1} - 1.086x_{i2} + 14.0782x_{i3} + 65.9631 \\ 869.5739x_{i1} + 2.332x_{i2} - 14.5046x_{i3} + 1411.0711 \\ -212.8733x_{i1} - 1.2539x_{i2} + 4.6449x_{i3} - 1073.4666 \\ -5.9301x_{i1} + 0.17781x_{i2} - 0.20351x_{i3} + 186.8546 \\ \\ 4.2754x_{i1} - 0.78843x_{i2} - 0.90251x_{i3} - 36.3698 \\ -9.2776x_{i1} + 1.5498x_{i2} + 1.7279x_{i3} + 23.166 \\ 13.0915x_{i1} - 0.28935x_{i2} - 0.17319x_{i3} + 289.7765 \\ -12.1544x_{i1} + 0.20809x_{i2} + 0.078541x_{i3} - 258.9833 \\ 7.732x_{i1} - 2.0381x_{i2} - 2.2662x_{i3} - 110.655 \\ -0.47073x_{i1} + 0.0038029x_{i2} - 0.042574x_{i3} - 21.8213 \\ -17.7097x_{i1} + 3.6141x_{i2} + 4.1094x_{i3} + 129.285 \\ 22.5788x_{i1} - 2.9102x_{i2} - 3.203x_{i3} + 102.5134 \\ -8.9476x_{i1} + 0.59945x_{i2} + 0.59255x_{i3} - 116.5911 \\ 0.77405x_{i1} + 0.051571x_{i2} + 0.079786x_{i3} + 12.8944 \\ \\ -3868.2614x_{i1} + 79.5253x_{i2} - 462.0922x_{i3} + 2113.4244 \\ 7906.812x_{i1} - 161.0093x_{i2} + 371.8474x_{i3} - 1778.4755 \\ -4725.6467x_{i1} + 79.4431x_{i2} + 6046.3447x_{i3} - 2062.8812 \\ 4197.468x_{i1} - 69.2982x_{i2} - 5842.2955x_{i3} + 44.0653 \\ -9219.3343x_{i1} + 193.9805x_{i2} - 2770.9318x_{i3} - 870.714 \\ 210.3719x_{i1} - 3.3949x_{i2} - 318.4217x_{i3} + 3854.5763 \\ 17272.3402x_{i1} - 357.6809x_{i2} + 3034.5621x_{i3} + 692.0237 \\ -16282.3058x_{i1} + 324.0861x_{i2} + 2028.4896x_{i3} - 383.1109 \\ 4599.4458x_{i1} - 85.7111x_{i2} - 2751.5821x_{i3} - 3173.9799 \\ -58.9797x_{i1} - 0.44373x_{i2} + 610.6942x_{i3} + 1569.4755 \\ \\ 50.8564x_{i1} - 255.124x_{i2} + 82.958x_{i3} - 287.3712 \\ 246.3905x_{i1} - 42.9835x_{i2} - 170.2555x_{i3} + 122.2611 \\ -2032.0611x_{i1} + 6203.658x_{i2} + 108.9124x_{i3} + 250.1612 \\ 1996.1157x_{i1} - 5975.2238x_{i2} - 97.2873x_{i3} + 56.6001 \\ 94.2982x_{i1} - 2253.3393x_{i2} + 195.9105x_{i3} + 93.5464 \\ 307.7237x_{i1} - 324.7832x_{i2} - 4.9431x_{i3} + 10.7052 \\ -269.538x_{i1} + 2096.2925x_{i2} - 369.3578x_{i3} - 148.3659 \\ -1217.9378x_{i1} + 2842.303x_{i2} + 353.7683x_{i3} - 252.4029 \\ 1061.9629x_{i1} - 2949.9979x_{i2} - 102.4319x_{i3} - 244.7406 \\ -226.0915x_{i1} + 604.9342x_{i2} + 1.9779x_{i3} + 353.9938 \end{array} \right]$$

1.6. Duffing oscillator network with binary interconnection topology.

Collected data.

$$\begin{aligned}
\mathcal{U}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.16596 & -0.70649 & -0.20647 & -0.5911 & -0.16539 & 0.60149 \\ 0.75278 & -0.66034 & 0.91578 & 0.373 & & \end{bmatrix} \\
\mathcal{W}_i^{0,\mathcal{T}} &= \begin{bmatrix} 0.35252 & -0.65226 & 0.062107 & 0.60499 & 0.093904 \\ -0.79982 & -0.50198 & -0.12929 & -0.75618 & -0.57538 \\ -3.1635 & -1.5088 & 2.6027 & 2.029 & -11.27 \\ 0.74922 & 0.63137 & 0.60503 & 0.053064 & 0.5354 \\ -0.29852 & -0.66393 & -0.64265 & 0.307 & -0.77074 \\ 2.9137 & -40.115 & -0.20112 & -2.5718 & 6.4111 \end{bmatrix} \\
\mathcal{X}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.05 & -0.045 & -0.043965 & -0.067886 & -0.096934 & -0.13991 \\ 0.05 & 0.010352 & -0.23922 & -0.29048 & -0.42979 & -0.46283 \\ -0.1862 & -0.20975 & -0.20817 & -0.22547 & & \\ -0.23549 & 0.015709 & -0.17298 & 0.093142 & & \end{bmatrix} \\
\mathcal{X}_i^{1,\mathcal{T}} &= \begin{bmatrix} 0.05 & 0.010352 & -0.23922 & -0.29048 & -0.42979 \\ -0.39648 & -2.4957 & -0.51261 & -1.3931 & -0.33035 \\ -0.46283 & -0.23549 & 0.015709 & -0.17298 & 0.093142 \\ 2.2733 & 2.512 & -1.8869 & 2.6612 & 1.1261 \end{bmatrix} \\
\mathcal{N}_i^{0,\mathcal{T}} &= \begin{bmatrix} -0.05 & -0.045 & -0.043965 & -0.067886 & -0.096934 & -0.13991 \\ 0.05 & 0.010352 & -0.23922 & -0.29048 & -0.42979 & -0.46283 \\ -0.0025 & -0.00046582 & 0.010517 & 0.019719 & 0.041661 & 0.064755 \\ -0.1862 & -0.20975 & -0.20817 & -0.22547 & & \\ -0.23549 & 0.015709 & -0.17298 & 0.093142 & & \\ 0.043848 & -0.0032949 & 0.03601 & -0.021001 & & \end{bmatrix}
\end{aligned}$$

Designed matrices via SOSTOOLS.

$$\begin{aligned}
\mathcal{X}_i^{11} &= \begin{bmatrix} -0.0102 & 9.42e-5 & 4.57e-6 \\ 9.42e-5 & -0.0116 & -6.98e-6 \\ 4.57e-6 & -6.98e-6 & -0.0114 \end{bmatrix}, \quad \mathcal{X}_i^{22} = \begin{bmatrix} -0.0403 & -2.37 & -0.0221 \\ -2.37 & -143.0 & -0.838 \\ -0.0221 & -0.838 & -0.998 \end{bmatrix} \\
\mathcal{X}_i^{12} &= \begin{bmatrix} -0.0105 & -0.269 & -8.09e-4 \\ -0.0314 & -1.96 & -0.00559 \\ -0.00317 & -0.115 & -0.164 \end{bmatrix}, \quad \mathcal{X}_i^{21} = (\mathcal{X}_i^{12})^\top \\
P_i &= \begin{bmatrix} 0.32406 & 2.4062 & 0.015931 \\ 2.4062 & 151.9 & 0.39897 \\ 0.015931 & 0.39897 & 1.1414 \end{bmatrix}
\end{aligned}$$

$$\mathcal{H}_i(x_i) = \begin{bmatrix} 4.4113e - 05x_{i1} + 1.2175e - 05x_{i2} - 1.6791 \\ 0.00011865x_{i1} + 3.2745e - 05x_{i2} - 1.7967 \\ -3.7223e - 05x_{i1} - 1.0273e - 05x_{i2} + 0.50009 \\ 4.4111e - 05x_{i1} + 1.2174e - 05x_{i2} - 0.11856 \\ 1.407e - 05x_{i1} + 3.8833e - 06x_{i2} + 0.47058 \\ -7.6911e - 06x_{i1} - 2.1227e - 06x_{i2} + 0.24454 \\ -1.2182e - 05x_{i1} - 3.362e - 06x_{i2} - 2.2227 \\ 0.00011277x_{i1} + 3.1122e - 05x_{i2} - 5.5988 \\ -4.2294e - 05x_{i1} - 1.1673e - 05x_{i2} - 2.981 \\ -9.6553e - 05x_{i1} - 2.6648e - 05x_{i2} - 5.4036 \\ -0.00037982x_{i1} - 4.8071e - 05x_{i2} + 0.62257 \\ -0.0010216x_{i1} - 0.00012929x_{i2} + 1.636 \\ 0.00032049x_{i1} + 4.0562e - 05x_{i2} - 0.49387 \\ -0.00037981x_{i1} - 4.8069e - 05x_{i2} + 0.61324 \\ -0.00012115x_{i1} - 1.5333e - 05x_{i2} + 0.18837 \\ 6.6222e - 05x_{i1} + 8.3812e - 06x_{i2} - 0.12552 \\ 0.00010489x_{i1} + 1.3275e - 05x_{i2} - 0.14814 \\ -0.00097093x_{i1} - 0.00012288x_{i2} + 1.625 \\ 0.00036416x_{i1} + 4.6089e - 05x_{i2} - 0.54128 \\ 0.00083134x_{i1} + 0.00010522x_{i2} - 1.2001 \\ 0.60719x_{i1} + 0.005215x_{i2} + 5.872 \\ 1.6331x_{i1} + 0.014026x_{i2} + 11.6018 \\ -0.51234x_{i1} - 0.0044004x_{i2} - 15.3898 \\ 0.60716x_{i1} + 0.0052148x_{i2} - 5.3108 \\ 0.19367x_{i1} + 0.0016634x_{i2} - 4.2769 \\ -0.10586x_{i1} - 0.00090924x_{i2} + 6.3806 \\ -0.16767x_{i1} - 0.0014401x_{i2} + 8.539 \\ 1.5521x_{i1} + 0.013331x_{i2} + 7.5197 \\ -0.58215x_{i1} - 0.005x_{i2} + 4.7487 \\ -1.329x_{i1} - 0.011414x_{i2} - 19.4389 \end{bmatrix}$$