Behaviour Dynamics in Social Networks - Assignment 4

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Abstract

Learn to use parameter tuning tools to find the best values for a set of missing parameter values in a model.
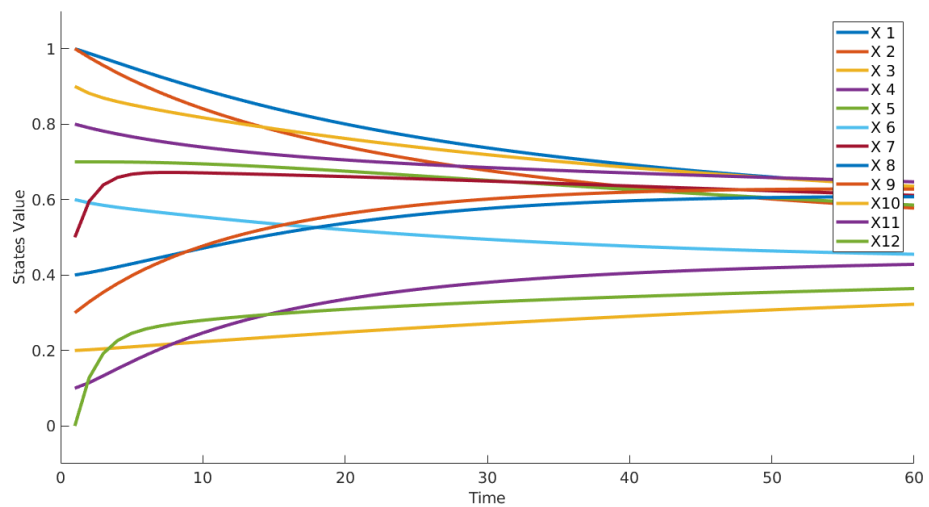
1 Part 1

Figure 1: Results from the simulation

2 Part 2

3 Part 3

The best value for η_L is η_L=0.05.

η_L	K(t = 2)	L(t = 2)	|K-L(t = 2)|	K(t = 13)	L(t = 13)	|K-L(t = 13)|	Sum of differences
0	0.1146	0	0.1146	0.2221	0	0.2221	0.3367
0.05	0.1146	0.0127	0.1019	0.2395	0.1232	0.1162	0.2181
0.10	0.1146	0.0255	0.0892	0.2517	0.1949	0.0568	0.1460
0.15	0.1146	0.0382	0.0765	0.2603	0.2359	0.0243	0.1008
0.20	0.1146	0.0509	0.0637	0.2664	0.2592	0.0072	0.0709
0.25	0.1146	0.0636	0.0510	0.2708	0.2724	0.0016	0.0526
0.30	0.1146	0.0764	0.0383	0.2739	0.2799	0.0060	0.0443
0.35	0.1146	0.0891	0.0256	0.2763	0.2844	0.0081	0.0337
0.40	0.1146	0.1018	0.0128	0.2781	0.2873	0.0092	0.0220
0.45	0.1146	0.1145	0.0001	0.2795	0.2892	0.0097	0.0098
0.50	0.1146	0.1273	0.0126	0.2806	0.2906	0.0100	0.0226

Table 1: Exhaustive search for different values of η_L

η_L	**SSR**	Error
0	0.9593	0.0816
0.05	0.0222	0.0124
0.1	0.0463	0.0179
0.15	0.1618	0.0335
0.2	0.2621	0.0427
0.25	0.3402	0.0486
0.3	0.4010	0.0528
0.35	0.4491	0.0558
0.4	0.4881	0.0582
0.45	0.5202	0.0601
0.5	0.5472	0.0616

Table 2: Exhaustive search for different values of η_L
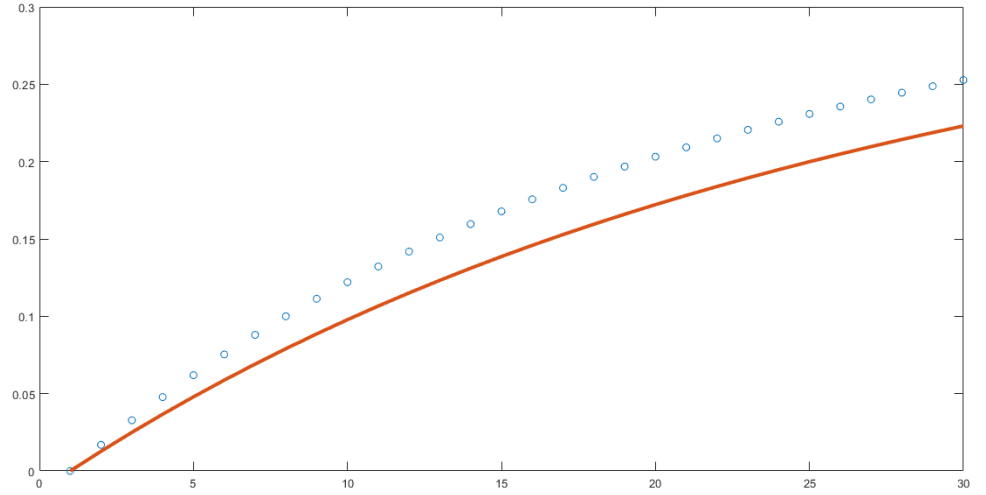
Figure 2: Simulated values for η_L=0.05 (line) vs empirical values (dots)

4 Part 4

η_i	value
η_1	0.125
η_2	0.128
η_3	0.316
η_4	0.121
η_5	0
η_6	0.038
η_7	0.195
η_8	0.128
η_9	0.156
η_{10}	0.021
η_{11}	0.319
η_{12}	0.347

Table 3: Exhaustive search for different values of η

If we want to use exhaustive search with grain size of 0.01, we should check 101^{12} sets of values.

The corresponding error is 0.1725.