

Behaviour Dynamics in Social Networks - Assignment 4

Maria Hotoiu, Federico Tavella

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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

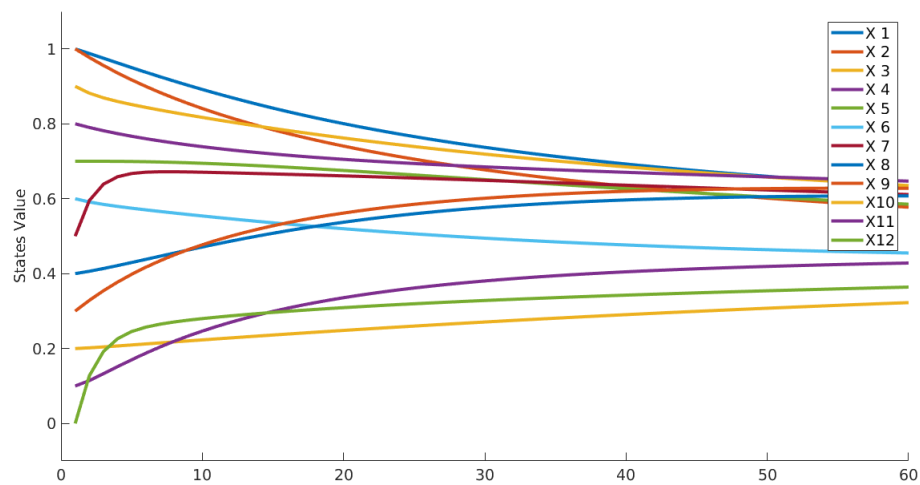


Figure 1: Results from the simulation

2 Part 2

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

3 Part 3

η_L	SSR	Error
0	0.9593	0.2827
0.05	0.0222	0.0430
0.10	0.0463	0.0621
0.15	0.1618	0.1161
0.20	0.2621	0.1478
0.25	0.3402	0.1684
0.30	0.4010	0.1828
0.35	0.4491	0.1935
0.40	0.4881	0.2017
0.45	0.5202	0.2082
0.50	0.5472	0.2135

Table 2: Exhaustive search for different values of η_L

The best value for η_L is $\eta_L=0.05$.

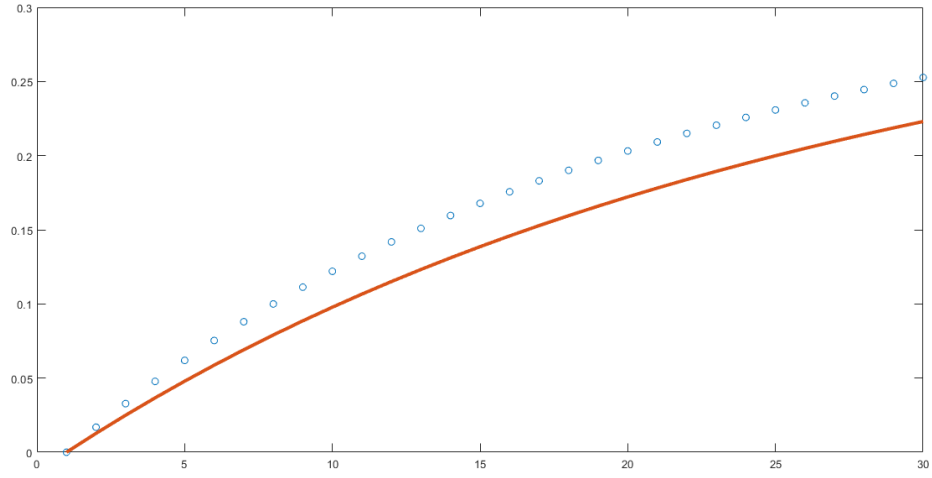


Figure 2: Simulated values for $\eta_L=0.05$ (line) vs empirical values (dots)

4 Part 4

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

η_i	value
η_1	0.257
η_2	0.105
η_3	0.062
η_4	0.078
η_5	0.323
η_6	0.089
η_7	0.370
η_8	0.229
η_9	0.113
η_{10}	0.032
η_{11}	0.139
η_{12}	0.312

Table 3: Best set of values for η

The error corresponding to these speed factors is 0.1046.

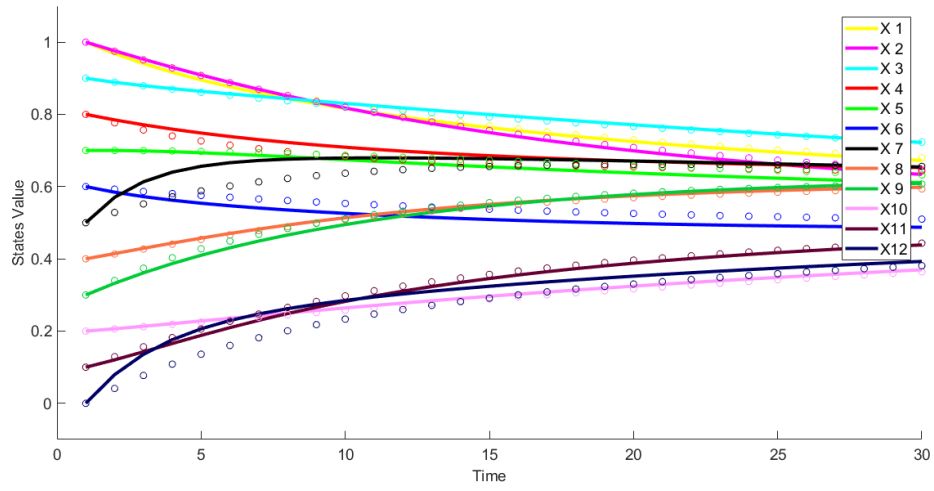


Figure 3: Simulated values vs empirical values