

## Supplementary Table 2

In the Small World Network, we increase the value of  $p$ , and show the discrimination of degree, 2-order degree, and 4-order degree, with the number of nodes  $n$  and initial connection edges  $d$  change over 54 cases.

			degree	2-order degree	4-order degree
n=5000, d=25	p=0.3	std	2.7584	96.866	1.19E+05
		alpha=0.8	0.005	0.0082	0.0124
		alpha=0.9	0.214	0.2208	0.2584
	p=0.5	std	3.5314	141.34	2.25E+05
		alpha=0.8	0.0096	0.018	0.027
		alpha=0.9	0.249	0.2642	0.2916
	p=0.6	std	3.87E+00	163.65	2.91E+05
		alpha=0.8	0.0124	0.0184	0.0232
		alpha=0.9	0.2426	0.2788	0.3032
n=7500, d=25	p=0.3	std	2.7353	95.265	1.15E+05
		alpha=0.8	0.0050667	0.0066667	0.011467
		alpha=0.9	0.2132	0.21387	0.23787
	p=0.5	std	3.5056	140.89	2.25E+05
		alpha=0.8	0.0096	0.017867	0.025733
		alpha=0.9	0.25027	0.2604	0.28653
	p=0.6	std	3.9064	165.99	2.97E+05
		alpha=0.8	0.016133	0.0224	0.029467
		alpha=0.9	0.2468	0.28093	0.30387
n=9000, d=25	p=0.3	std	2.7281	95.191	1.16E+05
		alpha=0.8	0.0045556	0.0058889	0.011444
		alpha=0.9	0.20944	0.212	0.24544
	p=0.5	std	3.5347	140.86	2.23E+05
		alpha=0.8	0.0098889	0.015889	0.021778
		alpha=0.9	0.25089	0.26089	0.28278
	p=0.6	std	3.9039	165.45	2.96E+05
		alpha=0.8	0.014778	0.021889	0.026778
		alpha=0.9	0.24811	0.283	0.30111
n=5000, d=50	p=0.3	std	3.8297	254.55	1.12E+06
		alpha=0.8	0.0004	0.0004	0.0004

	p=0.5	alpha=0.9	0.064	0.075	0.0874
		std	4.9733	379.84	2.21E+06
		alpha=0.8	0.0006	0.0004	0.0006
	p=0.6	alpha=0.9	0.1102	0.1186	0.1258
		std	5.454	442.13	2.90E+06
		alpha=0.8	0.0006	0.0008	0.0014
n=7500, d=50	p=0.3	std	3.7684	250.54	1.10E+06
		alpha=0.8	0	0	0.00053333
		alpha=0.9	0.062533	0.075467	0.087333
	p=0.5	std	4.9721	379.25	2.20E+06
		alpha=0.8	0.00026667	0.00053333	0.00053333
		alpha=0.9	0.10973	0.1168	0.1248
	p=0.6	std	5.4437	443.91	2.95E+06
		alpha=0.8	0.0010667	0.0010667	0.0012
		alpha=0.9	0.14213	0.12547	0.13413
n=9000, d=50	p=0.3	std	3.879	257.1	1.13E+06
		alpha=0.8	0.00033333	0.00077778	0.0012222
		alpha=0.9	0.075556	0.082889	0.095222
	p=0.5	std	4.9923	380.57	2.21E+06
		alpha=0.8	0.00022222	0.00055556	0.00088889
		alpha=0.9	0.10811	0.12	0.12944
	p=0.6	std	5.4566	445.29	2.95E+06
		alpha=0.8	0.0023333	0.0022222	0.0025556
		alpha=0.9	0.14011	0.125	0.13289