Assignments Nº 9

released: 08.01.2014   **due:** 14.01.2014,12:00h

Task 1: Parameter Interpretation   5 points

The table shows the results for the parameter estimations for the Harry Potter dataset.

Rate parameters:						
0		Rate parameter	5.11	(1.14	)	
1 .	eval	outdegree (density)	-10.16	(1.70	)	0.07
2 .	eval	reciprocity	3.45	(0.96	)	0.02
3 .	eval	transitive triplets	0.53	(0.12	)	0.01
4 .	eval	gender alter	0.32	(0.61	)	0.09
5 .	eval	gender ego	0.03	(0.51	)	0.04
6 .	eval	gender similarity	-0.39	(0.46	)	-0.01
7 .	eval	house alter	-1.26	(1.07	)	0.02
8 .	eval	house ego	-1.02	(0.10	)	-0.04
9 .	eval	same house	1.69	(0.14	)	0.03
10.	eval	year alter	1.06	(0.33	)	0.00
11.	eval	year ego	-0.54	(0.29	)	0.05
12.	eval	year similarity	9.66	(2.81	)	0.04

Provide the table for the *house* related contributions to the objective function and interpret the results.
In the Data section on the homepage you will find the report file with the other relevant informations.

Task 2: Markov Chain Comparison   5 points

Discuss the differences and similarities between the markov chains we used to simulate from ERGM with the markov chains used for defining SAOM.

Task 3: Expected Value and MoM $\qquad$ **5 points**

Suppose somebody generated 10 undirected, simple, loopless graphs according to $\mathcal{G}(30, p)$. The number of edges y_i in each graph is reported in the following table:

	g_1	g_2	g_3	g_4	g_5	g_6	g_7	g_8	g_9	g_{10}
y_i	37	40	35	32	39	34	25	28	41	32

Let Y be a random variable that describes the number of edges within $\mathcal{G}(30, p)$, such that:

$$P(Y = y) = \binom{M}{y} p^y (1-p)^{M-y} \qquad M = \frac{n(n-1)}{2}$$

Find a plausible value of p that generated the data with the Method of Moments and compare your results to the Maximum Likelihood Estimation we used in Sheet 1.

Task 3: R: Network Evolution $\qquad$ **5 points**

Implement the network evolution algorithm according to the pseudocode given in the lecture slides.
Add a parameter that allows the user to switch between a *conditional* and an *unconditional* stopping rule.

Send your R-Script to `david.schoch@uni-konstanz.de`