University of Konstanz
Algorithmics Group
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Network Modeling
Winter Term 2014/2015

Assignments $\mathcal{N}^{\underline{o}}$ 5

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Task 1: Estimating ERGMs: higher order statistics 10 points

Import the adjacency matrix of the network observed at the third time point (file `net-3.csv`), the demographic characteristics (file `demographics.csv`), and the delinquency behaviour (file `delinquency.csv`) of the actors . Create a network object using the adjacency matrix and name the object `netwdir`. Check that the network is directed and add the gender of the pupils and the delinquency behaviour of the pupils at wave 3 as attributes (SEE Assigment 3, Task 3).

(a) Estimate the model including the following statistics: `edges`, `mutual`, `nodematch("gender")`, `gwesp(alpha=0.01,fixed=TRUE)`, and `absdiff("delinquency")`

(a.1) Analyse the goodness of fit of this model.

(a.2) Export the plots provided by the goodness of fit function in a pdf file and send it in together with the R script.

(a.3) Suggest statistics in order to improve (at least) one aspect of the goodness of fit (e.g. the 0 out-degree)

Hint:
to better understand the higher order statistics it might be useful to have a look at the paper Hunter(2007)

`http://www.inf.uni-konstanz.de/algo/lehre/ws14/nm/local/papers/Hunter_2007.pdf`

and particularly page 221 (below formula (15)) and page 222 (first paragraph).