

Assignments \mathcal{N}^o 11

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Task 1: Data Collection

9 points

You are planning to analyze the development of friendships within a group of university freshmen which are initially mutual strangers.

- (1) What is a good schedule to collect your data, keeping in mind that each survey is costly and you should collect enough information on network changes?
- (2) You also want to analyze the co-evolution of friendship and alcohol consumption. What is now a good schedule to collect your data?
- (3) Would you collect other data (covariates) to study the coevolution of friendship and alcohol consumption?

Task 2: Behavioral Objective Function

6 points

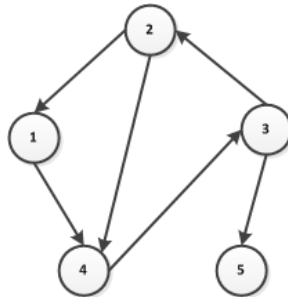
Consider the depicted network with 5 actors where ties indicate friendship. The behavior z denotes the sporting activity level with the following possible values:

- 1: no sports at all
- 2: sport once a week
- 3: sport twice a week
- 4: sport more than three times a week

Let us assume that Actor 2 has the opportunity to change his behavior in the current micro step. The current values of z are $(2, 3, 1, 3, 4)$. The following parameters and statistics are given:

<i>outdegree</i>	$\beta_{out} = -1.3$
<i>reciprocity</i>	$\beta_{rec} = 2.1$
<i>transitive Triplets</i>	$\beta_{tran} = 0.4$
<i>quadratic shape effect</i>	$\gamma_{quad} = 0.1$
<i>linear shape effect</i>	$\gamma_{linear} = -0.5$
<i>average similarity effect</i>	$\gamma_{avsim} = 0.6$

- (1) Assume that we are considering the two *basic shape effects*. What is the most probable change in Actor 2s behavior?
- (2) Assume now that we are considering the *average similarity effect*. What is now the most probable change in Actor 2s behavior?



Task 3: R: Behavioral Objective Function

5 points

Write the following function in R:

- (1) The function *objfct.behavior* should return the vector of probabilities of all **possible** behavioral changes that an actor i can make. The arguments should be an actor id i , a vector γ of the parameters for the basic shape effects, where γ_1 is the quadratic shape effect and γ_2 is the linear shape effect and actor i s current behavior.

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