*Assignment #5*

# This assignment explores an international trade network. The network is the largest connected component of the broader trade network and the values are the logged amount of trade from the exporters (rows) to the importers (columns). The object of trade is musical instruments (see http://www.princeton.edu/~ina/trade/index.html).

# 1. Blockmodels

First, plot the network. Is the graph useful? If so, how so? If not, why not?

Next, build a blockmodel with default settings in sna.

1. Plot a dendogram from the hierarchical step and choose the number of blocks (k).
   1. Describe your choice.
2. Construct the blockmodel with given k
   1. Plot the blockmodel (or, the matrix that hasn’t been reduced).
   2. Plot the block image matrix (or, the matrix that is k x k).
   3. Plot the block image network (or the network with k nodes).

Hint: You can build the blockmodel without making a network (e.g. keeping the network as an igraph object). You can do this by peeling off the directed adjacency matrix and then running the clustering routine and blockmodel over the matrix. Like this:

#Make adjacency matrix

mat <- as.matrix(get.adjacency(as.directed([your graph])))

library(sna)

#Make hierarchies

sc <- equiv.clust(mat)

#Plot dendogram

plot(sc)

#Build blockmodel

blocks <- blockmodel(mat, sc, k=[your # k])

Last, describe this blockmodel and what it tells us about international trade.

Hint: Something like this could also be helpful.

country\_blocks <- data.frame(country=blocks$plabels, blocks=blocks$block.membership)

$plabels stores the labels of the blockmodeled rows/columns and $block.membership is the assigned blocks.

# 2. Holes, Social Capital, Weak Ties

Use two techniques to describe social capital, positions, and/or roles within these data. For example, what is the relationship between betweenness and constraint. Plot your results and describe what you find.