

Network Dynamics and Simulation
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Workshop on CINET – August 11, 2015

CINET/GRANITE Exercise – III(b)

Purpose: To Compare the structural properties of a network with its shuffled version.

Note: Please take a look at Exercise II(a) which explains how to add a graph to the list of available networks.

Sketch of the Procedure: We will indicate how a shuffled network can be generated for one value of the fraction f of the number of edges. You can try different values of f . In Steps 5 through 8 below, we will mention a few structural measures that can be compared. Please feel free to try other measures as well.

1. Choose a network from the list of available networks in CINET. (Let G_1 denote this network.)
2. In the “Measures” tab of CINET, choose “Shuffle (switch) edges”.
3. When you start the analysis (by clicking on the “Analyze” button), the system will ask you to input the fraction f of the number of edges to be switched. To begin with, choose the fraction 0.1. (You can repeat all of the steps for other values of f .)
4. Generate the shuffled version G_2 of G_1 and upload G_2 to CINET.
5. Compute and compare the degree distributions of G_1 and G_2 .
6. Compute and compare the clustering coefficient distributions of G_1 and G_2 .
7. Compute and compare the numbers of articulation points of G_1 and G_2 .
8. Compute and compare the numbers of bridge edges of G_1 and G_2 .