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Workshop on CINET – August 11, 2015

CINET/GRANITE Exercise – II(b)

Purpose: Experimentation with random graph generation facility of CINET.

Note: Please take a look at Exercise II(a) which explains how to generate a random graph in CINET and how to add it to the list of available networks.

Goal of the Exercise: Consider random graphs generated using the Erdős-Renyi (ER) model on 1000 nodes. As we increase the edge probability, the number of edges in the generated graph increases. The goal of this exercise is to experiment with various probability values and find the *smallest* probability value at which the generated graph has a certain property. Examples of such properties include the following.

(a) The graph has a giant component with at least 900 nodes.

(b) The graph is connected.

(c) The graph has no bridge edges.

Feel free to choose any one of the properties above. You should try to make the required probability value *as small as you can.*

Sketch of the procedure: First choose a graph property; let us call it P. You need to try various edge probability values and find the smallest value. (If you are familiar with binary search, you can do this in a systematic manner.)

For each probability value p, you need to carry out the following steps.

1. Generate the random graph with edge probability p.
2. Add it to the list of networks in CINET.
3. Compute the measure corresponding to property P.

Depending on the value of the measure obtained in Step 3 above, you must increase or decrease the value of p appropriately for the next try.