Modelling and Analysis of Complex Networks

Exercise 6

Due: 13:00 on Nov. 8, 2024

The maximum score of this assignment is: **16 points**. Please submit the assignment in any readable data format (.txt, .doc, .pdf, .md ...) and submit the assignment before the deadline. If you have additional information concerning your answers, please also upload the document to the Moodle, or include the link to the document in your answers (e.g., link to your Github repository). Please indicate your team number in your submission.

Now let's explore more about the two datasets we have: Facebook-Ego and Twitter-Ego. The following questions can be answered with the help of NetworkX. You may also use other packages to deal with the problem. Please answer the following questions on both of the networks you have and submit your executable code. **3 + 5 + 3 + 5 = 16 points)**

(a) Please randomly choose two sets of nodes in Facebook-Ego dataset (each consists of 50 nodes without repetition), and calculate the cut size and conductance between the two sets of nodes. Please also plot the partitioning.

(b) Please repeat the process mentioned in (a) again but with different sets of nodes. What differences have you observed? What cause the differences?

(c) Please output the Laplacian matrix of Facebook-Ego dataset.

(d) Please return the list of cliques over the entire Facebook-Ego dataset.