LAK tutorials 9-11

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To pass the tutorials, you have to attend all tutorials and submit (solve) at least 50% of homework assignments. There are two types of homework assignments:

1. A-type: You have to finish this assignment if you do not attend the tutorials,

2. Star-type: Throughout the semester, you have to submit (solve) at least 50% of these homework assignments.

Please, submit your solutions in PDF format to cerny@kam.mff.cuni.cz.

A-type assignment

Exercise 1

Show that the spectrum of bipartite graphs is symmetric.

Star-type assignment

Exercise 2

Show that for a bipartite graph, if the determinant of its adjacency matrix is non-zero than the graph has a perfect matching and show that the opposite implication does not hold.

Exercise 3

Show that the Laplacian matrix of a graph is positive semi-definite.

Exercise 4

Determine all graphs such that their adjacency matrix has exactly 2 different eigenvalues.