Linköping University
Department of Mathematics
Lars Eldén

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Matrices and Statistics with Applications
Computer Assignment
Graph Partitioning

Matlab users: Use the Matlab function `publish` (on the toolbar of the Matlab editor) to prepare the report.

R users: Use the reporting tool of R.

Purpose: Given a graph, partition it in two subgraphs using spectral graph partitioning.

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1. Download the adjacency matrix of the karate club graph from
   `https://users.mai.liu.se/larel04/kurser/KarateClub.txt`

2. illustrate the adjacency matrix using `spy` in Matlab or `image` in R.

3. Compute the Laplacian and its two smallest eigenvalues λ_1 and λ_2 and the corresponding eigenvectors v_1 and v_2. Plot the eigenvectors.

4. Reorder v_2 so that it becomes monotone and plot it.

5. Apply the same reordering to the adjacency matrix and illustrate it. Compare to the original adjacency matrix. Choose a suitable partitioning point from v_2. How many edges are broken with this choice?

R users: It may be necessary to use `image(rotate(A))`.

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