Hierarchical clustering in Pajek

Procedure is composed of two steps:

- computing dissimilarity matrix

- hierarchical clustering according to the obtained dissimilarity matrix

Before running procedure generate complete cluster using Cluster/Create Complete Cluster. In this way dissimilarities will be computed among all units.

Run Operations/Dissimilarity*/Network Based and select

- **d1/All** – if you want to consider network as binary matrix, or

- **Corrected Euclidean** or **Corrected Manhattan** distance – for valued networks, in this case parameter p (0, 1, or 2) must be entered. Parameter p tells how to count *diagonal* and *direct connection* between two units.

Additionally you are asked for the name of file where EPS picture of dendrogram will be saved (you can use program **GSView** to see the result). If you press *Cancel* at this point only dissimilarity matrix will be computed (the procedure will not continue with hierarchical clustering).

Results of hierarchical clustering procedure in Pajek are:

- Dissimilarity matrix.

- EPS picture of dendrogram.

- Permutation of vertices according to dendrogram. You can use this permutation to draw reordered matrix in EPS (File/Network/Export Matrix to EPS/Using Permutation)

- Hierarchy representing hierarchical clustering. Some approaches to use the hieararchy for further analysis and visualization:

  - Check the option Edit/Show Subtree (show all units in the subtree of selected cluster).

  - After you decide what are suitable clusters (according to dendrogram), close the corresponding nodes by pressing Edit/Change Type or Ctrl+T so long that the word **Close** appears.

  - Transform hierarchy into partition (Hierarchy/Make Partition).

  - You can examine the result using Draw/Draw-Partition, or draw the reordered matrix File/Network/Export Matrix to EPS/Using Permutation with lines among clusters.

By default *Ward* method is used. If you want to use another method, select

Net/Hierarchical Decomposition/Clustering/Options

Blockmodeling in Pajek

Blockmodeling can be run in two different ways:

- start with random partition into given number of clusters
  Operations/Blockmodeling*/Random Start

- optimize the given partition (for example partition obtained from hierarchical clustering)
  Operations/Blockmodeling*/Optimize Partition

After running the appropriate option, select

- type of equivalence – Structural or Regular. You can also define your own blocks, by selecting 3–Define. In this case you can define for each block in the image matrix which type of blocks are allowed and what is the penalty for the block. The model defined in this way can be saved to a file (Save as MDL File) and loaded later (Load from MDL File).

- number of repetitions

- number of clusters

After you set all options, press Run.

In the case of optimization of given partition, you are not asked for number of clusters, and number of repetitions.

The result of blockmodeling procedure are all different partitions with the lowest value of criterion function (one or more partitions).

If you want to export reordered matrix (with lines among clusters) you must generate the permutation using Partition/Make Permutation first.