Course project «Optimization approaches to community detection»

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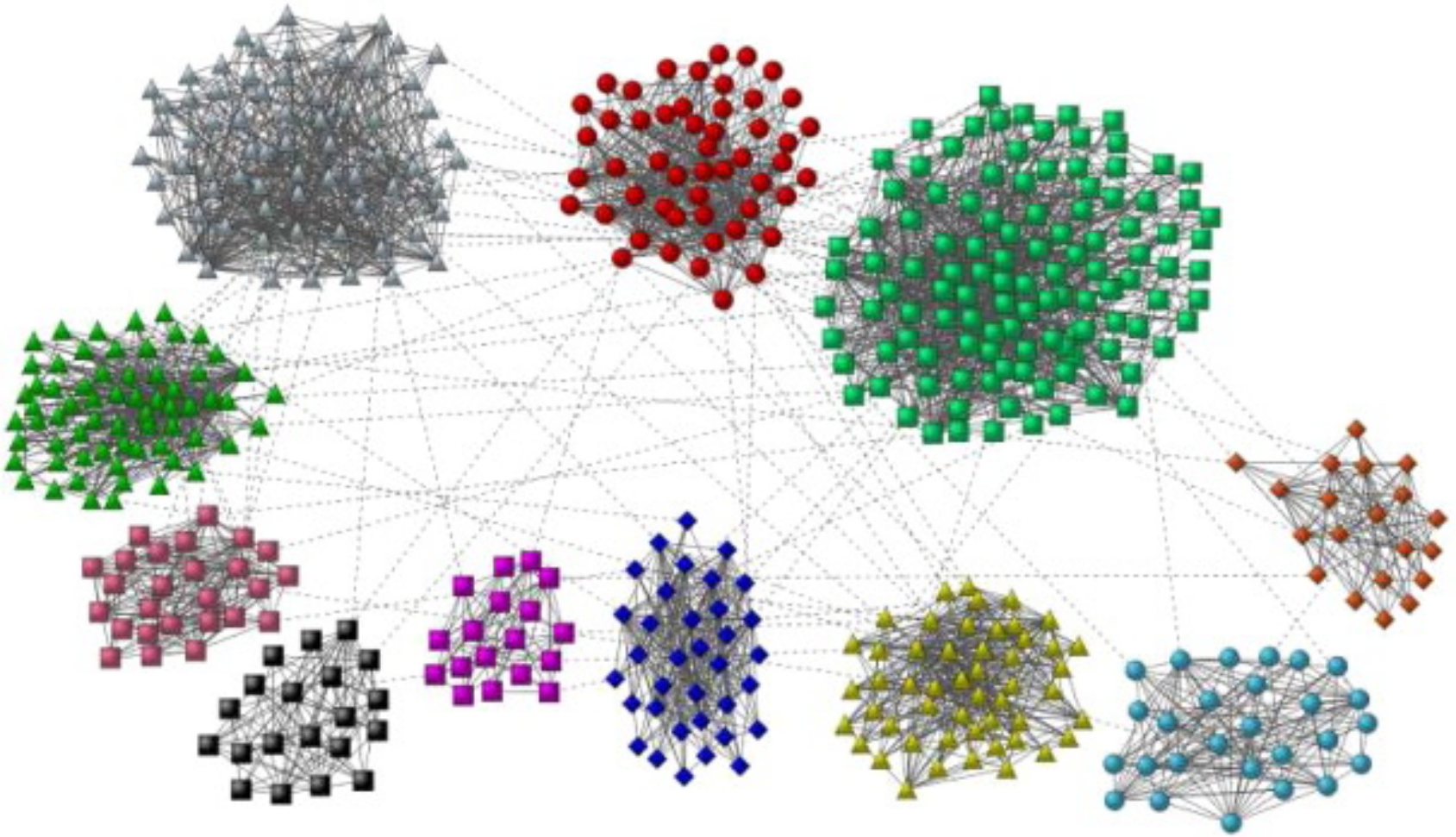
Plan

Example



Notations

Assumption

We consider **undirected unweighted** graphs **without loops** with n nodes. The nodes are enumerated as $\{1, ..., n\}$.
Graph is given by its $n \times n$ adjacency matrix A.

Goal of community detection

Find **partition** of nodes into **non-overlapping** clusters.
The number of clusters is k.
The clusters are denoted as $\{\mathcal{C}_1, ..., \mathcal{C}_k\}$.

Spectral method

Formulating an optimization problem

Spectral method

Modularity-based method

Formulating an optimization problem

Modularity-based method

Conjugate gradients method

Formulating an optimization problem

Conjugate gradients method

Semidefinite relaxations

Formulating an optimization problem

Semidefinite relaxations