Using Graph Partitioning Codes for Anticipation of Power System Splits

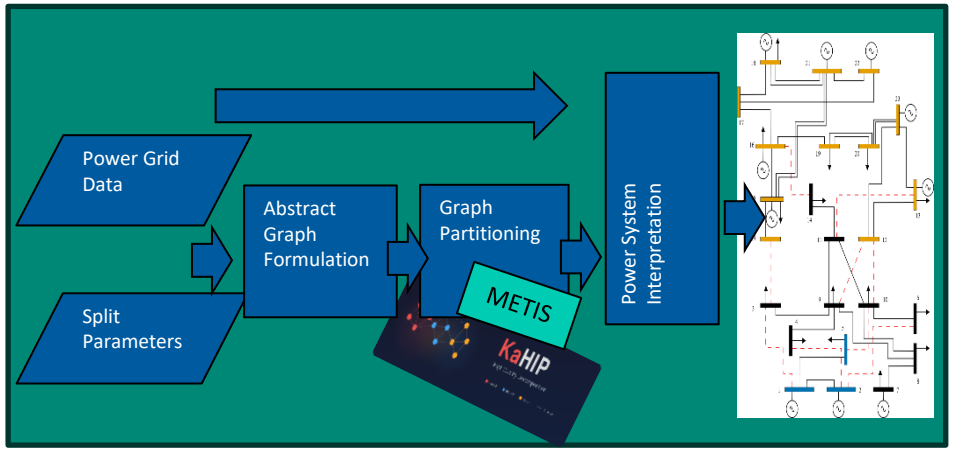
EINS
ENERGY INFORMATION NETWORKS AND SYSTEMS

TECHNISCHE UNIVERSITÄT DARMSTADT

Project Seminar, Bachelor's Thesis, Master's Thesis

Motivation:

Graph partitioning is a fundamental problem with a wide range of applications. Over the years, numerous algorithms and libraries have been developed to address this problem family. These approaches typically optimize for one standard objectives, i.e. minimizing the cut size, and under a standard constraint, i.e. producing partitions of roughly equal size.
While well-studied and effective in many applications, for power network system split generation one has to consider different objectives and constraints, such as power (im-)balance, required ancillary services, or power flow feasibility. It remains unclear how established graph partitioning algorithms perform when used to anticipate power systems system split scenarios, and if and how such algorithms could best be adopted.



Goal:

The work is supposed to identify limitations of standard methods and libraries applied to power system splits and the work should develop possible adaptions to use them for power system applications.

Tasks:

1. Develop procedures to adapt standard algorithm implementations for power system specific partitioning (e.g. using domain specific un-coarsening, iterative changes of edge cut weights).
2. Discuss trade-offs between solution quality, constraint satisfaction, and computational complexity / realistic runtimes / scalability.

Requirements:

- basic understanding of graph theory
- good programming skills

M.Sc. Hans Stenglein
hans.stenglein@eins.tu-darmstadt.de
+49 (0) 6151 16-21720
in S3|10 Room 310

Contact me if you are interested!