Comparison of different MILP Formulations for System Split Aware Network Planning

EINS
ENERGY INFORMATION NETWORKS AND SYSTEMS

TECHNISCHE UNIVERSITÄT DARMSTADT

Project Seminar / Master's Thesis

Motivation:

Recent mathematical programming literature has shown renewed interest in different MILP formulations for multi-way graph partitioning.
We ask: How do different MILP formulations describing graph partitions perform when included into network design problems with planning and operational constraints?

Goal:

The aim of the proposed work is to compare different MILP formulations calculating system splits with constraints and objectives uncommon in the mathematical programming literature, but relevant to power systems (graph partitioning with power systems related constraints).

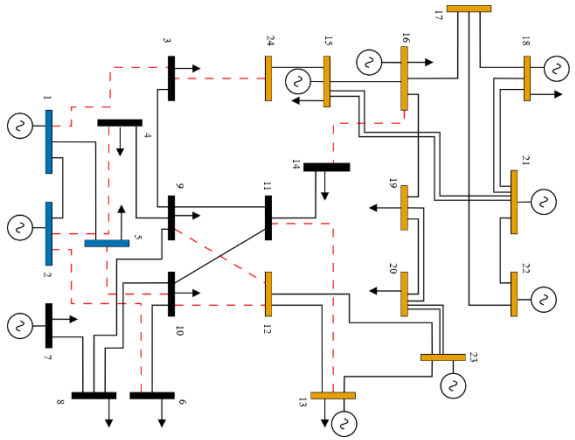

Figure 1: A split of IEEE-24bus-RTS into 3 islands

Tasks:

1. Understand and implement multi-component connectivity / *k*-way cut MILP formulations from the literature (virtual flows, representatives)
2. Compare the fit of the basic models to power systems related constraints / analyze resulting model sizes and possible synergies with submodels for power-system-specific objectives and constraints.
3. Test the solve times and robustness of the formulations against parameter changes on the same graph.

Requirements:

- basic understanding of graph theory
- good programming skills
- experience with or strong commitment to learn Mixed-Inter-Linear-Programming

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!