optimation

Proposal for thesis work

Solving optimization problems based on logistics models

Background

Optimation has developed a simulation platform called OEE Optimizer, used for strategic decision support in the process industry. By combining data driven and first-principle models, flexible and accurate complete site and company models are created and used for analysis and strategic decisions regarding investments, plant configuration, energy flows, emissions etc. Main customers are currently within minerals & mining, energy, and logistics industries.

Motivation

Recently, a library called PlantLib OEE has been developed to support simulation of logistics processes (for example how trucks deliver raw material from a mine to comminution plants) and other general long term simulations. The models are developed in Modelica language and can be exported as FMUs if needed. We are interested in investigating how optimization problems based on PlantLib OEE models can be formulated and solved with existing optimization tools, ranging from heuristic optimization to gradient based methods.

Scope and deliverables

1. Describe the current state-of-art of optimization algorithms for complex mixed-integer problems and select promising alternatives.
2. Learn Dymola and get familiar with the PlantLib OEE library.
3. Solve optimization problems created using PlantLib OEE models with an increasing degree of difficulty.
4. Document the complete workflow from model building, interfacing Dymola and the chosen optimization algorithm/platform, running an optimization and analysing and validating results.
5. Report and presentation at Optimation and the student's University.

The thesis work will be carried out at one of our five offices in Sweden. Optimation will assign one main responsible supervisor for the project, and we offer a competitive economic compensation for the work. The scope can be adjusted for one or two thesis workers.

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#optimization, #OEE, #logistics