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## Referee's report on the PhD thesis

### Long – term combined heat and power production and trade planning

By Michal Dvořák

The thesis deals with heat and power plant modelling. The model presented in the paper is mixed binary variables linear programming problem. The problem is dynamic with long term horizon so the model contains a lot of binary and continuous variables. There are non-linearities in enthalpies modelling, so the piece-wise linear function is used but this method needs many binary variables. The original model is not therefore solvable in accepted time limit so the long term optimization model is decomposed into a set of short term models connected with some overlaps time segments (EHC enhanced horizon cutting method).

I have just some remarks:

- In definition of mixed integer linear programming problem are non-negativity conditions omitted (Pg. 7, 30, 31, 32, 48, 50), only binary variables are defined (not integer).
- The SOS2 set and piece-wise linear function modelling should be included in the paper.
- Pg. 20: equation (3,1) is the same as two equations (3,1a) and (3,1b), (3,4) is (3,4a)-(3,4g).

**Summary: I recommend to accept** the thesis for the following reasons:

A new heuristic method (EHC) is proposed for the problem, the method is proved on real data, EHC is solved on GUROBI software, connected with Matlab and pre-processor written in C++.

The computational results are convincing.

Author used some advanced technique for MILP model EHC, e.g. Lagrangian relaxation, new branching variable selection rule, tightening of bounds method,...

**The work has a high scientific quality so I support the promotion of Mr. Dvořák to PhD degree.**

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