

Industrial application of optimization with Modelica and Optimica using intelligent Python scripting

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This paper shows how different kinds of optimization related task such as of-line optimization or optimal control are solved using a combination of Modelica, Optimica, JModelica.org [1] and Python [2]. The application examples presented in this paper are all real industrial applications in the field of Combined Cycle Power Plants, namely the water-steam cycle.

Figure 1 shows a part of a water-steam cycle used in an offline optimization of a plant start-up.

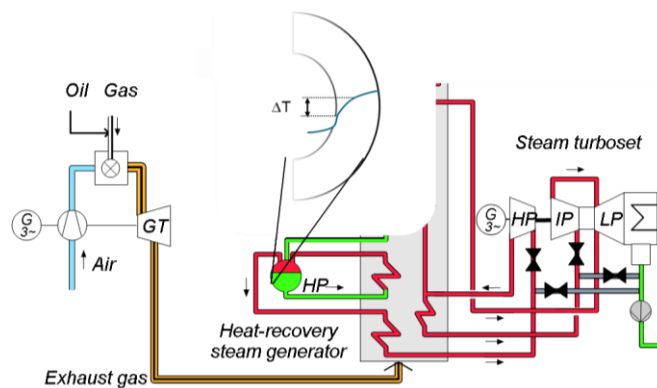


Figure 1: Model for startup optimization

Besides the offline optimization of a power plant startup, the paper also includes an example of a nonlinear model predictive control with state estimation using the extended Kalman filter and a parameter estimation of a Modelica model representing the plant layout shown in Figure 1.

The focus of the paper lies on the interaction of Modelica, Optimica, JModelica and Python and demonstrates the suitability of Python as scripting environment in this context.

References

- [1] JModelica.org, <http://jmodelica.org/>, viewed 2013-12-05.
- [2] Python Software Foundation. Python Programming Language - Official Website, <http://www.python.org/>, 2012, viewed 2013-12-05