

Modeling and Online Optimization of a Steam Turbine Network

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The purpose of this study is to develop and apply an online optimization system for a steam turbine network. First, a rigorous hybrid model for condensing steam turbines was developed on the basis of the steam property equations to calculate the ideal power generation rate and of a support vector regression to estimate the overall efficiency of the steam turbines accurately. The developed hybrid model is able to predict the power generation of a steam turbine with the prediction errors of 1 ~ 2 %. Then, using the steam turbine model, an optimization problem was formulated to maximize the power recovery from the steam turbine network. Finally, an online optimization system that consists of a model update system, an optimization engine, and an optimization client was developed. The energy cost has been reduced by about one percent since the optimization system had been applied to the steam turbine network.