Application of Predictive Control in District Heating Systems

In district heating systems, and in particular if the heat production takes place at a combined heat and power (CHP) plant, a reasonable control strategy is to keep the supply temperature from the district heating plant as low as possible. However, the control is subject to some restrictions, for example, that the total heat requirement for all consumers is supplied at any time and each individual consumer is guaranteed some minimum supply temperature at any time. A lower supply temperature implies lower heat loss from the transport and the distribution network, and lower production costs. A district heating system is an example of a non-stationary system, and the model parameters have to be time varying. Hence, the classical predictive control theory has to be modified. Simulation experiments are performed in order to study the performance of modified predictive controllers. The systems are, however, described by transfer function models identified from real data.

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