

## Model Predictive Control of the Condensate Recycle Process in a Co-generation Power Plant: Controller Design and Numerical Application

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This study describes a development of a multi-variable Model Predictive Control (MPC) system for the condensate recycle process in a co-generation power plant of Korea East-West Power Co. The objective of the control system is to regulate the levels of three major tanks in the process. Besides large disturbances and various intricate constraints, the most difficult problem in designing MPC is that the process operation switches over several modes depending on seasons and weather conditions. This hampers the model finding through identification experiments. To overcome the difficulty, a detailed process simulator was developed first as a numerical plant for derivation of linear model for the controller design depending on various operating modes and also for the test of the designed controller. In the design of MPC, the focus was made on devising easy tuning knobs. For this, a Kalman filter-based tuning method was devised. Numerical evaluation shows that the designed MPC performs quite well mitigating interactions and suppressing disturbances, that are not effectively handled by single loop PID controllers.