

Min-max controller output configuration to improve multi-model predictive control when dealing with disturbance rejection

Abdul Wahid, author

Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=9999920531776&lokasi=lokal>

Abstrak

A Multiple Model Predictive Control (MMPC) approach is proposed to control a nonlinear distillation column. This control framework utilizes the best local linear models selected to construct the MMPC. The study was implemented on a multivariable nonlinear distillation column (Column A). The dynamic model of the Column A was simulated within MATLAB® programming and a SIMULINK® environment. The setpoint tracking and disturbance rejection performances of the proposed MMPC were evaluated and compared to a Proportional-Integral (PI) controller. Using three local models, the MMPC was proven more efficient in servo control of Column A compared to the PI controller tested. However, it was not able to cope with the disturbance rejection requirement. This limitation was overcome by introducing controller output configurations, as follows: Maximizing MMPC and PI Controller Output (called MMPCPIMAX). The controller output configurations of PI and single linear MPC (SMPC) have been proven to be able to improve control performance when the process was subjected to disturbance changes (F and zF). Compared to the PI controller, the first algorithm (MMPCPIMAX) provided better control performance when the disturbance sizes were moderate, but it was not able to handle a large disturbance of + 50% in zF.