TEMPERATURE CONTROL DESIGN BASED ON MPC(MODEL PREDICTIVE CONTROLLER) FOR MIMO(MULTIPLE INPUT MULTIPLE OUTPUT) PROCESS

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Abstract

MIMO process is commonly used in many industrial applications. MIMO process is a system which has interconnection between one process to another, which means that input one affects to the output of the other process, and input two to another and so on. This condition makes difficulty for control system designer to make a good controller. One of the controllers which can be used to handle MIMO process is MPC (Model Predictive Controller) and type of MPC which is used in this experiment is DMC (Dynamic Matrix Controller).

DMC is one of the MPC controller that mostly used. To describe MIMO plant, this experiment using two heaters which mounted on a shaft and two thermocouples which are plugged on it, to monitor the temperature changes. This controller design will pass two steps, simulation and implementation. Simulation step consists of open loop test, system identification and DMC control algorithm. This step used to determine the controller parameters needed to implemented to the real plant.

From the controller simulation we got controller’s parameters i.e prediction horizon, control horizon, move suppression factor and alpha. After we got those parameters, then it can be implemented to the real plant.

Keyword: MPC, DMC, MIMO