

C817729 : MAJOR CHEMICAL ENGINEERING

KEY WORD: PROCESS COTROL / BATCH REACTOR / POLYMER REACTOR / MODEL BASED CONTROL

THANAKORN BOOTTARAM : TEMPERATURE CONTROL OF SEMIBATCH POLYMER REACTOR USING GMC CONTROLLER. THESIS
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ISBN 974-332-369-4

The temperature control of semi-batch polymerization reactor faces many difficulties because firstly, the exothermic chemical reactions of a polymerization are not known exactly. Secondly, the heat transfer coefficient of the reactor decreases with time due to the deposition of polymers inside the reactor. Finally, frequently change in polymer grades needs to be retune a PID controller. This has stirred the need in the application of robust control techniques in industries. This paper presents the application of a Generic Model Control (GMC) for the temperature control of a semi-batch polymerization reactor. The kinetic models addressed by Teymour and Ray (1989) is applied to simulate the chemical reaction occurring inside the reactor.

Since GMC is a model-based controller, it needs the measurement/estimate of process variable and parameters. Here, the heat released of reaction is unmeasurable, therefore, the deterministic on-line estimator is used to estimate the heat released of reactions. Simulation results show that the GMC can control the temperature of the semi-batch reactor at a desired setpoint. Its performance is remarkably better than that of the PID controller in the presense of plant/model mismatches.

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