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Process Systems Engineering and Process Safety

Composition control and temperature inferential control of dividing wall column based on model predictive control and PI strategies☆

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ABSTRACT

The dividing wall column (DWC) is considered as a major breakthrough in distillation technology and has good prospect of industrialization. Model predictive control (MPC) is an advanced control strategy that has acquired extensive applications in various industries. In this study, MPC is applied to the process for separating ethanol, *n*-propanol, and *n*-butanol ternary mixture in a fully thermally coupled DWC. Both composition control and temperature inferential control are considered. The multiobjective genetic algorithm function "gamultiobj" in Matlab is used for the weight tuning of MPC. Comparisons are made between the control performances of MPC and PI strategies. Simulation results show that although both MPC and PI schemes can stabilize the DWC in case of feed disturbances, MPC generally behaves better than the PI strategy for both composition control and temperature inferential control, resulting in a more stable and superior performance with lower values of integral of squared error (ISE).

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