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Temperature Control Improvement of Membrane Reactor

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Abstract : Temperature control improvement of a membrane reactor with exothermic and reversible esterification reaction is studied in this work. It is well known that a batch membrane reactor requires different control strategies from a continuous one due to the fact that it is operated dynamically. Due to the effect of the operating temperature, the suitable control scheme has to be designed based reliable predictive model to achieve a desired objective. In the study, the optimization framework has been preliminary formulated in order to determine an optimal temperature trajectory for maximizing a desired product. In model predictive control scheme, a set of predictive models have been initially developed corresponding to the possible operating points of the system. The multiple predictive control moves have been further calculated on-line using the developed models corresponding to current operating point. It is obviously seen in the simulation results that the temperature control has been improved compared to the performance obtained by the conventional predictive controller. Further robustness tests have also been investigated in this study.

Keywords : model predictive control, batch reactor, temperature control, membrane reactor
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