Modified Internal Model Control With PID Controller for Stable and Time Delayed Processes

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Abstract

Internal Model Control (IMC) is a commonly used technique that provides a transparent mode for the design and tuning of various types of process. Mathematically an exactly modelled process can result perfect control. PID controllers are widely used in many process industries and they provide satisfactory results for set-point tracking as well as for disturbance rejection but their responses are generally oscillatory, which interns result mechanical fatigueness. The parameters of the physical system vary with operating conditions and time, hence it is essential to design a control system that shows robust performance and better set-point tracking. In this present study, we propose modified IMC controller which is based upon traditional controller technique such as IMC and PID. Several transfer functions are taken into account for the model of the actual process or plant(Exothermic CSTR, Four tank interacting systems) as we have exactly little or no knowledge of the actual process. The proposed method incorporates the effect of model uncertainties and disturbances entering into the process. The proposed method has been compared with other works of IMC, PID(Ziegler Nicholas), PID(Shamsuzzoha and lee) presented in the same field. Conclusively, simulated results shows that the proposed method provides better set-point tracking and disturbance rejection compare to methods.

Keywords: Internal Model Control, PID Controller, Exothermic CSTR, Four tank interacting system