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Tuning of PID controller using multiple dominant poleplacement technique for stable third order processes

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Tuning of PID Controller for stable Third Order plus Time Delay (TOPTD) and Third Order plus Time Delay with a Zero (TOPTDZ) system is proposed in the present work. The PID Controller is designed based on Multiple Dominant Pole Placement (MDP) Method. Simulation results on linear models of TOPTD and TOPTDZ and non-linear models like isothermal CSTR and bio-reactor are done to observe the performance of the proposed Controller using errors like Integral Square Error (ISE), Integral Absolute Error (IAE) and Integral Time Absolute Error (ITAE). The performance under model uncertainty is also observed considering perturbation in one parameter at a time using Kharitonov's theorem. For stable TOPTD/TOPTDZ systems, performance of the proposed MDP-PID controller is compared with the controller designed based on performance specification like Overshoot (Shamsuzzoha 2013), the controller designed by IMC method (Zhi-cheng et al., 2010; Shamsuzzoha and Lee, 2007), Direct Synthesis Method (DSM) (Chidambaram, 1998; Chen and Seborg, 2002; Seshagiri rao and Chidambaram,2006) and Equating Coefficients (EC) (Padma Sree and Chidambaram, 2006) method both for perfect parameters and for model uncertainty. Simulation results on number of case studies of stable TOPTD, TOPTDZ and non-linear models are presented to show the effectiveness of the proposed method, which tells that the proposed MDP-PID controller gives better results when compared with the other methods.

Biography

Sowjanya have expertise in indentifying and solving the problem using new techniques. Her solving technique based on reducing the errors obtain by the parameters in PID Controller when compared with the other techniques her technique obtain better results. The technique is based on Multiple Dominant Ploeplacement where the Controller is tuned with a compensator. Their results are useful to all Chemical Industries because there is no Chemical Industry without a Controller. Her technique reduces the maintaining cost of the equipment and increases the purity of the product. Her approach is responsive to all Chemical Industries.

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