Analytical Design of PI controller for Optimal Servo Control of General First Order Processes with Output Constraint

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In this paper, the analytical design method is considered to find the optimal PI parameters for optimal servo control of general first order processes with output constraint. The objective function for the optimal design is to minimize both the rate of change of the manipulated variable and the controlled variable for a given set-point step change subject to the constraint of the maximum allowable limit in the controlled variable. The simulation results show the proposed method finds a global optimum point in an efficient manner and thus the resulting PI controller results in the optimal servo responses in any case.