Robust Multi-loop IMC-PID Controller Design for
Multi-delay Processes

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The well-known internal model control (IMC) approach was proved to design the IMC-PID tuning rules analytically and to obtain insight into the robustness issues in the multivariable processes. In this study, a new derivation of the robust IMC-PID controller for multiple-input/multiple-output (MIMO) system is proposed for several representation multivariable process models, which produces the significant improved responses for both the set-point tracking and disturbance rejection. The simulation study demonstrates that the multi-loop IMC-PID controllers design by proposed method provides fast, well-balanced, and robust responses in compared with other well-known methods, when all controllers are tuned to have the same degree of robustness according to the measure of the maximum upper bound in the input/output multiplicative uncertainty for the robust stability.