A New Tuning Method for Centralized PID Controllers in MIMO Processes

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Multi-input multi-output (MIMO) processes are frequently encountered in industrial field. In case of highly coupled MIMO processes, decoupling technique should be applied to attenuate their control loop interactions. In our previous research, the control loop interactions are effectively reduced by using the proposed centralized PID controllers which remove off-diagonal component of a process transfer function. So, in this research, a new heuristic tuning method is developed to secure versatility of the proposed method in industrial field. The proposed method has n diagonal part PID controllers and n^2-n off-diagonal part PID controllers. The diagonal part PID controllers are determined by using relative gain array (RGA) and tuned by conventional PID tuning method. And off-diagonal part PID controllers are initially tuned on the basis of process model and retuned by the proposed heuristic tuning method to guarantee good decoupling performance. The proposed method is validated by MIMO level control system.