CONTINUOUS TIME IDENTIFICATION AND DECENTRALIZED PID CONTROLLER OF AN AEROTHERMIC PROCESS

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Submitted: Apr. 11, 2012 ***Accepted: May 9, 2012*** ***Published: June 1, 2012***

Abstract- The interactions between input/output in multivariable processes represent a major challenge in the design of decentralized controllers. In this paper, a simple method for the design of decentralized PID controller is proposed. It consists to combine the conventional PID controller with the static decoupler approach. For each single loop, the individual controller is independently designed by applying the internal model control (IMC) tuning rules. To demonstrate the effectiveness of the proposed method, the PID controller with and without decoupling is implemented on an aerothermic process. It is a pilot scale heating and ventilation system equipped with a heater grid and a centrifugal blower, fully connected through the Humusoft MF624 data acquisition system for real time control. The outcome of the experimental results is that the main control objectives, such as set-point tracking and interactions rejection are well achieved. The

experimental results have shown that the proposed method provides a significant improvement compared to conventional PID controller.

Index terms*:* Continuous-time identification, aerothermic process, decentralized PID controller, static decoupling, TITO control systems.