



DECENTRALIZED PI-D CONTROLLER APPLIED TO AN AEROTHERMIC PROCESS

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Abstract- The aerothermic process is a pilot scale heating and ventilation system. It is equipped with a heater grid and a centrifugal blower, fully connected through the Humusoft MF624 data acquisition system for real time control. The interaction between its main variables is considered as challenging for mono-variable controllers. An abrupt change in the ventilator speed might cause an undesirable disturbance in the air temperature representing a factor that must be managed to conserve energy. To annul the effect of this interaction, this paper presents an experimental comparison between three forms of the PID controller: the conventional PID controller, the PI-D controller and its decentralized version. A multi-variable continuous state space model is obtained from on-line experimental data. The outcome of the experimental results is that the main control

objectives, such as set-point tracking and interactions rejection, are well achieved for the temperature and the air flow simultaneously.

Index terms: Decentralized PI-D Controller, PI controller, Derivative kick, Aerothermic Process, TITO control systems, static decoupler.