

MODELING AND CONTROLLER DESIGN FOR THE VVS-400 PILOT SCALE HEATING AND VENTILATION SYSTEM

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Abstract- In this paper, a heating and ventilation model VVS-400 from Instrutek, Larvik, Norway is modeled using ARX model structure and linear black-box technique. The conventional PID controller and artificial Fuzzy controller are designed based on the approximated plant model and real plant model. The approximated plant model is estimated using System Identification approach while the real plant model is developed by interfacing the Real-time Windows Target toolbox in Matlab with real VVS-plant by using data acquisition (DAQ) card PCI-1711. An artificial Fuzzy controller approach is incorporated in two ways which are conventional Fuzzy logic controller (FLC) and a replacement of conventional fuzzy controller known as Single input fuzzy logic controller (SIFLC). Simulations and experiment validate the equivalency of both controllers. Results reveal that SIFLC found to be better than FLC due to its less computation time compared to conventional FLC.

Index terms: System identification, estimation, ventilation, VVS-400, Autoregressive with exogenous input (ARX), PID, Fuzzy logic controller, Single input fuzzy logic controller