Design of combined robust controller for a pneumatic servo actuator system with uncertainty.

ABSTRACT

In this paper the position control design of a pneumatic servo actuator system using a combined H-inf /QFT technique is presented. First, an H-inf controller is designed to assure robust stability for the system. Particle swarm optimization (PSO) algorithm is used to tune the weighting functions. This method is used to find the optimal values of weighting functions parameters that lead to obtain an optimal H-inf-controller by minimizing the infinity norm of the transfer function of the nominal closed loop system. The quantitative feedback theory (QFT) is used to enhance the closed loop system performance. A multiplicative unstructured model extracted from the parametric uncertainty is used for control design. Finally, the simulation results are presented and compared with previous work.

Keyword: Nonlinear systems; Pneumatic actuators; Uncertain systems; Robust control; Combined controllers.