



---

# DC Motor Speed and Position Control Using Discrete-Time Fixed-Order $H_{\infty}$ Controllers

Mohamed A. Darwish, Hossam S. Abbas

## Abstract:

This paper describes the design and experimental implementation of a discrete-time fixed-order  $H_{\infty}$  controller for a DC motor speed and position control. To provide a model for the DC motor, two system identification techniques are employed. In the first one a model for DC motor speed control is identified in open-loop based on black box modeling whereas in the other one a model for position control is identified in closed-loop based on grey box modeling. An extension of HIFOO toolbox to discrete-time controller design developed recently is used to synthesize the controller. The performance of the designed controller in comparison with various control strategies is demonstrated. The paper aims at demonstrating simple modeling and control synthesis techniques with the help of available software tools to design low-complexity controllers in terms of design and implementation. Consequently, cheap hardware can be utilized for several applications.

## Published In:

IJIM: International Journal on Information Management , Vol. 1, No. 1 , pp. 1 ~ 13