



(1)

Microcontroller Implementation for DC Motor Speed and Position Control

Mohamed A. Darwish, Hossam S. Abbas, Awad I. Saleh, and Mohamed M. M. Hassan.

Abstract:

This paper presents the design and experimental implementation of a Fuzzy logic controller (FLC) for a DC servomotor speed and position control. The motivation to utilize the FLC is its robustness against model's parameters inaccuracy and uncertainty. The implementation of the FLC algorithm is carried out by a low cost 8-bit microcontroller instead of using expensive general purpose microprocessors which are commonly employed in practice. This leads to a reasonable hardware cost for such applications. The experimental results in terms of reference tracking and disturbance rejection show high performance with the FLC approach in comparison with PI and PD controllers designed for the same purposes.

Keywords:

DC motor control, Fuzzy logic controller, Mamdani Type Fuzzy Controller, Microcontroller

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(2)

DC Motor Position Control Using Discrete-Time Fixed-Order H_{∞} Controllers

Mohamed A. Darwish, Hossam S. Abbas

Abstract:

This paper describes the design and experimental implementation of a discrete-time fixed-order H_{∞} controller for a DC motor position control. Based on grey box modeling, a model of the DC motor is identified. 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.

Keywords:

Discrete-Time H_{∞} Control, DC Motor Position Control, DC Motor Speed Control, Fixed-Order Controllers, Microcontroller

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(3)

DC Motor Speed and Position Control Using Discrete-Time Fixed-Order H_{∞} Controllers

Mohamed A. Darwish, Hossam S. Abbas

Abstract:

This paper describes the design and experimental implementation of a discrete-time fixed-order H_{∞} 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.

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(4)

The quest for the right kernel in Bayesian impulse response identification: The use of OBFs

Darwish, Mohamed Abdelmonim Hassan; Pillonetto, Gianluigi; Tóth, Roland

Abstract:

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(5)

Nonlinear event-based state estimation using sequential Monte Carlo approach

Chitraganti, Shaikshavali; Darwish, Mohamed A. H.

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(6)

Prediction-error identification of LPV systems: A nonparametric Gaussian regression approach

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