

A New Model Reference Self-Tuning Fractional Order PD Control for One Stage Servomechanism System

MOHAMED ABDELBAR SHAMSELDIN ALY, Mohamed Sallam, A. M. Bassiuny,
A. M. Abdel Ghany

Abstract

This paper presents a new technique to adapt the fractional order PID (FOPID) control based on optimal Model Reference Adaptive System (MRAS). The proposed control technique has been subjected to motion control of one stage servomechanism system. This purpose should be achieved through different operating points and external disorders (friction and backlash). The parameters of MRAS have been obtained using the harmony search (HS) optimization technique to achieve the optimal performance. Also, the performance of proposed control technique has been investigated by comparing it with the PID and FOPID controllers. The practical results illustrate that the self-tuning FOPD control based on optimal model reference adaptive system can accommodate the tracking error rapidly respect to other control techniques

WSEAS TRANSACTIONS on SYSTEMS and CONTROL 2019, February