Practical Implementation of an Enhanced Nonlinear PID Controller Based on Harmony Search for One-Stage Servomechanism System

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Abstract

This paper presents a practical implementation for a new formula of nonlinear PID (NPID) control. The purpose of the controller is to accurately trace a preselected position reference of one stage servomechanism system. The possibility of developing a transfer function model for experimental setup is elusive because of the lack of system data. So, the identiýed model has been developed via gathering experimental input/output data. The performance of the enhanced nonlinear PID (NPID) controller had been investigated by comparing it with linear PID controller. The harmony search (HS) tuning system had built to determine the optimum parameters for each control technique based on an e ective objective function. The experimental and simulation results proved that the enhanced nonlinear PID (NPID) controller has better performance and more robust compared to linear PID controller. Both the simulation and the experimental results are identical signiýcantly.

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