Fractional Order PID Controller Design for Speed Control DC Motor based on Artificial Bee Colony Optimization

Abstract

A proportional–integral–derivative (PID) controller is very popular in applications that require an easy and comprehensive control. In this project, the application of soft-computing algorithm design based on Artificial Bee Colony (ABC) optimization technique is integrated with Fractional order PID controller (FOPID). It is an advancement of conventional PID controller in which the derivative and integral order are fractional rather than integer. Apart from the usual tuning parameters of PID, it has two more parameters \( \lambda \) (integer order) and \( \mu \) (derivative order) which are infractions. This increases the flexibility and robustness of the system and gives a better performance. The aim of this work is to design a speed controller of a DC motor by selection of proper FOPID parameters using bio-inspired optimization technique of Artificial Bee Colony Optimization (ABC). The application of ABC to the FOPID controller imparts it the ability of tuning itself automatically in an on-line process while the application of optimization algorithm to the PID controller makes it to give an optimum output by searching for the best set of solutions for the PID parameters.
References


Index Terms

Computer Science        Circuits and Systems

Keywords
Fractional Order PID Controller (FOPID), Artificial Bee Colony Optimization; Tuning Algorithm.