عنوان مقاله:

PSO Based Optimal Fractional PID Controller Design For an Active Magnetic Bearing System

محل انتشار:

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خلاصه مقاله:

Active magnetic bearing (AMB) is used for high rotational speed applications. In this paper, a fractional PID-like controller for improving the performance of active magnetic bearings system is investigated. This paper proposes a novel Particle Swarm Optimization (PSO) based design method for obtaining the parameters of a fractional PID-like controller and applies it to the control of an AMB system. Different from conventional PID controllers with three parameters - proportional constant, integral constant, and derivative constant - fractional controllers have some extraparameters. In general, the integral and derivative operations in fractional controllers are of non-integer order. The fractional controller is more flexible and gives the possibility of adjusting the closed-loop system characteristics more carefully. However, its design becomes more complex than that of conventional integer order PID controller. PSO technique is used to design the controller. The parameters of the fractional controller are selected as parameters to be determined. Simulation results demonstrate the superiority of the proposed fractional order controller to conventional integer order controllers.

کلمات کلیدی:

active magnetic bearing, fractional PID-likecontroller, particle swarm optimization

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