OPTIMIZATION OF DECENTRALIZED PI/PID CONTROLLERS BASED ON GENETIC ALGORITHM

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ABSTRACT

In this paper, an optimization method of tuning decentralized PI/PID controllers based on genetic algorithms is presented. First, the existence of decentralized PI controllers with integrity is examined. Then, stable regions of each PI/PID controller parameters are calculated as the feasible area to be exploited, and the optimal PI/PID controllers are obtained by using a real-coded genetic algorithm with elitist strategy, to meet the design specifications for the whole control system. The proposed method is applied to six examples from literature. Simulation results demonstrate that the proposed decentralized PI control is compatible to the referenced method while the decentralized PID control is better than the referenced method, and the proposed method is feasible for more complicated control systems optimizations.

KeyWords: Decentralized PI/PID, optimization, genetic algorithm, integrity.