Abstract

In conducting the design problem optimization algorithms, particle swarm optimization (PSO) could be conceivably stuck at a local minimum in a non-proper region of the search. This led to the need of developing a new class of solution method that can overcome this deficiency. For boots out such problems, this paper presents a fusion algorithm of a multi-subpopulation particle swarm optimization (MS-PSO). The main idea lies in dividing the main search space into multi-subpopulation regions. The fusion is based on performance measurements of the individuals of these multi-subpopulations for finding the optimal solution. The results are obtained by testing the particle swarm optimization and multi-subpopulation particle swarm optimization on the tuning of PID controller to a given system to improve its step response parameters. The result is compared with the performance of PID controller tuned using conventional methods. The proposed PSO based PID controller has significant improved performance.
A Multi-Subpopulation PSO Fusion based Optimal Tuning of PID Controller


Index Terms

Computer Science  Circuits and Systems
Keywords

PID, Step Response, Particle Swarm Optimization (PSO), Data Fusion, Multi-Subpopulation.