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Implementation of PID controller tuning using differential evolution and genetic algorithms

Abstract

This paper presents the implementation of PID controller tuning using two modern heuristic techniques which are differential evolution (DE) and genetic algorithm (GA). The optimal PID control parameters are applied for a high order system, system with time delay and non-minimum phase system. The performance of these techniques is evaluated by setting their objective functions as mean square error (MSE) and integral absolute error (IAE). The reliability between DE and GA in consistently maintaining minimum MSE is studied. The performance of the PID control systems tuned using GA and DE methods are also compared with Ziegler-Nichols method.

Keywords; Differential evolution; Genetic algorithm; Mean square error; PID controller; Ziegler-nichols