

PID controller tuning using evolutionary algorithms

Abstract

This paper presents the implementation of PID controller tuning using two sets of evolutionary 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 the two techniques is evaluated by setting its objective function with mean square error (MSE) and integral absolute error (IAE). Both techniques will compete to achieve the globally minimum value of its objective functions. Meanwhile, reliability between DE and GA in consistently maintaining minimum MSE is also been studied. This paper also compares the performance of the tuned PID controller using GA and DE methods with Ziegler-Nichols method.

Keywords; Differential evolution; Genetic algorithm; PID controller; Ziegler-nichols