Abstract

Classical controller, modern controllers, and intelligent controller are all described by parameterized models. Their parameters are to be adjusted to get the best controllers performance. The adjustment of the controller parameter is known a controller tuning. Tuning procedures include; trial and error method based on experience of skilled persons, another technique, is introduced by Ziegler &Nicholas. This technique is based on open loop experimental tests of the plant; however this method assumes certain shape of the step response. Also derivative based optimization algorithms can be used to minimize the tracking error of the plant by tuning the controller parameters, however these in local minima algorithms faces the problem of being trapped in local minima and results in poor performance.

Tuning of controller can be addressed using genetic algorithms, which has many advantages over the derivative based algorithm.

In this work GA is used for tuning of different types of controller including classical controller, mainly proportional-integral-derivative (PID) controller, lead compensator, lag compensator and lead-lag compensator.

Also the i/p and o/p tuning parameters of fuzzy controller are tuned. In all cases the mean square of the tracking error is minimized.

Computer simulation based on simulink and the optimization toolboxes of matlab are carried out to test the performances of controllers. The simulation results showed the goodness of this tuning technique.