Optimal Design of Robust Fractional Order PID for the Flight Control System

Abstract

Nature inspired algorithms are the most popular and robust algorithms for the optimization of the real world problems like pitch control of an aircraft system. This paper introduces Bat algorithm and Differential Evolution technique for the multi-objective optimization based designing of the fractional order PID (FOPID) and integer order PID controllers. The optimized values obtained from the techniques have been implemented for the Pitch control of an aircraft system to obtain the desired robust response. In this paper a mixed sensitivity H∞ problem is designed and simulated using Matlab. It has been shown that the design of FOPID using multi-objective bat algorithm gives better results than others.

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Index Terms

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Keywords

Fractional order PID controller; Bat algorithm; PID optimization; Mixed sensitivity problem; Pitch
control of an aircraft system.