Lecture Notes in Networks and Systems 100

Rajesh Kumar Shukla ·
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K. K. Shukla *Editors*

Social Networking and Computational Intelligence

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Jaya Algorithm Based Optimal Design of LQR Controller for Load Frequency Control of Single Area Power System

Nikhil Paliwal, Laxmi Srivastava and Manjaree Pandit

Abstract In this paper, Jaya algorithm has been proposed for optimizing the parameters of the linear quadratic regulator (LQR) for load frequency control (LFC). In feedback control system, LQR is an advanced and modern control technique. The LQR technique is based on minimizing the quadratic performance index. In the LQR controller, the main problem is to shape the weighting matrices Q and R. The problem to shape the weighting matrices Q and R in LQR controller can be solved using various evolutionary computing techniques. In this paper, the weighting matrices for load frequency control of the electrical power network are designed by using genetic algorithm and Jaya algorithm. It is shown that Jaya algorithm is the most powerful method, as it provides improved system performances by optimal design of the matrices Q and R to minimize settling time.

Keywords LFC · LQR · Single area power network · Genetic algorithm · Jaya algorithm

1 Introduction

These days, the demand of electrical power is rising and the main concern for the electrical power network operator is to provide better quality of electrical power at the end of consumers under various condition of changing load. The frequency of the electrical power network should be kept constant as far as possible for the satisfactory operation of the electrical power network. Many techniques have been proposed to overcome any deviations and to maintain constant value of frequency.

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