Article Abstract

Title:	Decentralized controller gain scheduling using PSO for power system restoration assessment in a two-area interconnected power system
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Abstract:	Load Frequency Control (LFC) is one of the most important issues in electrical power system design/operation and is becoming much more significant recently with increasing size, changing structure and complexity in restoration of interconnected power systems. In practice, LFC systems are used with simple Proportional-Integral (PI) or Integral (I) controllers. However, since the PI or I control parameters are usually tuned based on classical or trial-and-error approaches, they are incapable of obtaining good dynamic performance if the power system is more vulnerable due to various load changing scenarios in multi-area power system. For this reason, in this study the P and I control parameters are tuned based on Particle Swarm Optimization (PSO) algorithm for a better Load-Frequency Control in a Two-Area Two-Unit Thermal Reheat Power System (TATURIPS) with step load perturbation. To exemplify the optimum parameter search PSO is used as it is an optimization method, therefore, even in the uncertainty area of controller parameters, finds the best parameters for controller and obtained controller is an optimal controller. This makes a trade-off between exploration and exploitation of search space to find global optimum in less number of generations. A TATURIPS is taken for the study to illustrate the proposed method. To show effectiveness of proposed method, the performance of optimized PI controller is obtained with several time-domain simulations for various load changes scenarios and is presented. Simulation results emphasis on the better settling time based stability performance of optimized PI controller in the TATURIPS with GT unit when compared with that of the SMES and the conventional system two-unit two-area interconnected power systems.
Keywords:	Load Frequency Control, Particle Swarm Optimization, TATURIPS, Gas Turbine, Super Conducting Magnetic Energy Storage Device.