Design of FUZZY-3DOF-PID controller for an Ocean Thermal hybrid Automatic Generation Control system

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Abstract

Balancing of generation and demand is the most essential requirement for power system (PS) network. The frequency of generation varies for different kinds of sources incorporated in the PS network as well as for the variation of the loads. The power system integrated with different renewable energy (RE) sources needs to be controlled and stable with a small variation of loads. The automatic generation controller (AGC) is essential for achieving load frequency balance in the PS network. A mismatch of frequency between the supply and demand may lead to development of large system errors. In this paper, an intelligent and robust Fuzzy logic-based controller is proposed for AGC in power system incorporating different types of RE sources like solar, wind, and ocean-thermal. Controller parameters are optimally tuned using Firebug Swarm Optimization (FSO) algorithm. A 2-area-test system is considered as the test bench for the proposed controller. In a later stage a fuzzy hybrid 3DOF-PID controller is designed for controlling 3-area PS network containing RE sources . The designed controller is robust to load variation and the comparison of the various performance indices demonstrates the superiority of the proposed controller over other controllers .

Keywords

Automatic Generation Control (AGC) ; Firebug Swarm Optimization (FSO) ;

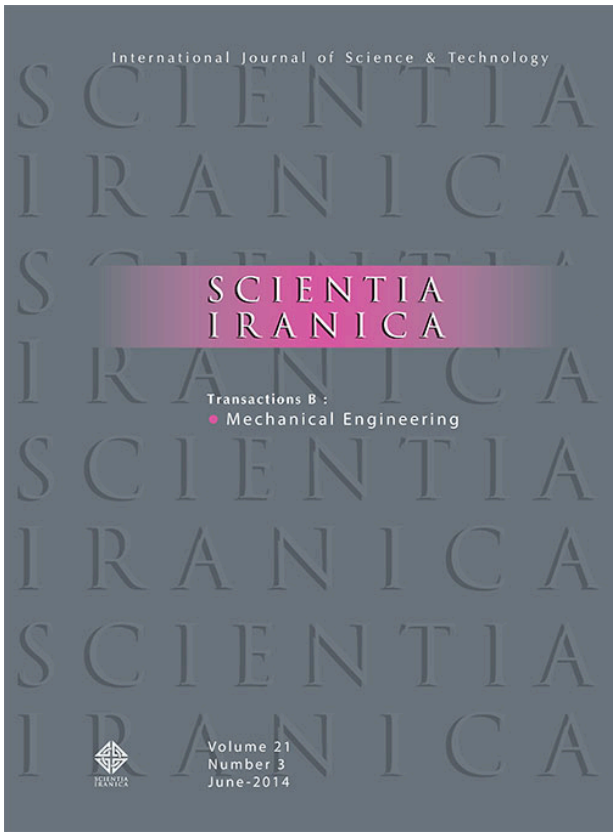
Fractional Order Proportional Integral Derivative Controller (FOPID) ;

Fuzzy. Non-Renewable Sources ;

3-degree freedom of proportional integral and derivative (3DOF-PID)

Main Subjects

Power Systems



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