Abstract

The Load Frequency Control (LFC) is of great importance in power system operation and control for providing sufficient and reliable electric power with good quality. Even though the simple Proportional-Integral (PI) controllers are still popular in power industry for frequency regulation it does not eliminate the conflict between the static and dynamic accuracy. This conflict may be resolved by employing the principle of Dual Mode control. The Dual Mode controller operates by switching between proportional controller mode and Integral controller mode depending upon the magnitude of the Area Control Error (ACE). The Artificial Bee Colony (ABC) algorithm is used to optimize the cost function of the two area interconnected power system along with the PI controller. In this paper proposes Dual Mode two layered fuzzy logic controller, each mode consists of two layer fuzzy logic controllers. The first layer is called pre-compensator, which is used to generate and update the reference value of Area Control Error (ACE). The second layer called feedback fuzzy logic controllers namely Proportional (P) like fuzzy logic controller, or Integral (I) like fuzzy logic controller. In addition to leveling load, the Super Capacitor Energy Storage Unit (SCES) is found to be advantageous for secondary control in the power system and maintains the power quality with the distributed power resource. To ensure the system stability due to sudden load disturbances, the power modulation control offered by SCES is enhanced to suppress the peak value of the transient
frequency deviation. Simulation results show that the proposed Dual Mode two layered fuzzy logic controller is not only effective in damping out the frequency oscillations, but also capable of alleviating the transient frequency swing caused by large load disturbance and moreover the proposed Dual Mode two layered fuzzy load frequency controller provides very good transient and steady state response compared to and Dual Mode PI controllers.

References

Dual Mode Two-Layer Fuzzy Logic based Load-Frequency Controller for a Two-Area Interconnected Power System with Super Capacitor Energy Storage Units


**Index Terms**

Computer Science

Control Systems
Keywords
Load-Frequency Control  Area Control Error  Integral Squared Error criterion  Dual Mode Two Layered Fuzzy Logic Controller
Super Capacitor Energy Storage Unit