Abstract

In this paper a linearized Heffron-Philips model of a Single Machine Infinite Bus power system with a Fuzzy Logic Power System Stablizer (PSS) is developed. The designed fuzzy-based PSS adjusts two inputs by appropriately processing of the input angular speed and angular acceleration signal, and provides an efficient damping. The behavior of the SMIB system with & without PSS has been compared/ verified by selecting appropriate fuzzy rules with the help of simulation work carried out in MATLAB/ SIMULINK environment. The performance of the SMIB system has improved significantly compared to SMIB system without PSS. The results of the simulation show that the fuzzy PSS is more effective in damping LFO compared to conventional controllers. Further this paper investigates the design and implementation of a reduced rule fuzzy logic power system stablizer. Fuzzy controllers use a rule base to describe relationships between the input variables and output. Implementation of a detailed rule base increases in complexity as the number of input variables grow. If each input has 7 fuzzy sets, a fuzzy controller with two inputs needs 49 rules. The implementation of a controller with such a large rule base is a tedious task. We propose a reduced rule fuzzy logic power system stablizer. The effectiveness of the reduced rule fuzzy logic power system stablizer is illustrated with simulations carried out in MATLAB.
References

- Samarasinghe V, Pahalawaththa N. Damping of multimodal oscillations in power systems using variable structure control techniques. IEE Proc Genet Trans Distrib 1997;


**Index Terms**

Computer Science

Fuzzy Logic

**Keywords**

Low Frequency Oscillations (LFO)  Damping  Fuzzy Logic Controller (FLC)  Fuzzy Set Theory

Simulink