A GA-Optimized Neuro-Fuzzy Power System Stabilizer for Multi-Machine System

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Abstract

The aim of this research is the design of a decentralized Power System Stabilizer (PSS) capable of performing well for a wide range of variations in system parameters and loading conditions. In addition, the designed PSS should provide effective damping of small/large disturbances and local/inter-area oscillations. The framework of the design is based on Fuzzy Logic Control (FLC). In particular, the neuro-fuzzy control rules are derived from training three classical PSSs; each is tuned using GA (Genetic Algorithms) so as to perform optimally at one operating point. The effectiveness and robustness of the designed stabilizer is investigated. The results of simulation prove that the proposed PSS offers a superior performance in comparison with the conventional stabilizer presently adopted by the industry.