

Stability Enhancement of a Large-Scale Power System Using Power System Stabilizer Based on Adaptive Neuro Fuzzy Inference System

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Abstract : A large-scale power system (LSPS) consists of two or more sub-systems connected by inter-connecting transmission. Loading pattern on an LSPS always changes from time to time and varies depend on consumer need. The serious instability problem is appeared in an LSPS due to load fluctuation in all of the bus. Adaptive neuro-fuzzy inference system (ANFIS)-based power system stabilizer (PSS) is presented to cover the stability problem and to enhance the stability of an LSPS. The ANFIS control is presented because the ANFIS control is more effective than Mamdani fuzzy control in the computation aspect. Simulation results show that the presented PSS is able to maintain the stability by decreasing peak overshoot to the value of -2.56×10^{-5} pu for rotor speed deviation $\Delta\omega; 2 \times 10^{-3}$. The presented PSS also makes the settling time to achieve at 3.78 s on local mode oscillation. Furthermore, the presented PSS is able to improve the peak overshoot and settling time of $\Delta\omega; 3 \times 10^{-9}$ to the value of -0.868×10^{-5} pu and at the time of 3.50 s for inter-area oscillation.

Keywords : ANFIS, large-scale, power system, PSS, stability enhancement

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