

Enhanced design of an indirect adaptive fuzzy sliding mode power system stabilizer for multi-machine power systems

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Description

This paper presents an enhanced indirect adaptive fuzzy sliding mode based power system stabilizer for damping local and inter-area modes of oscillations for multi-machine power systems. The proposed controller design is based on an adaptive fuzzy control combining a proportional integral controller with a sliding mode controller. Generator speed deviation and its derivative are selected as input signals to a fuzzy logic system that approximates unknown power system functions and a proportional integral regulator is used to eliminate the undesirable sliding mode chattering. Using Lyapunov synthesis, adaptation laws are developed in an enhanced indirect adaptive fuzzy scheme which closely tracks changes in power system operating conditions. Performance of the proposed stabilizer is evaluated for a two-area four-machine power system subjected to different types of disturbances. Simulation results are ...