

# An indirect adaptive fuzzy sliding mode power system stabilizer for single and multi-machine power systems

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## Description

This chapter presents an indirect adaptive fuzzy sliding mode power system stabilizer (AFSMPSS) that is used to damp out the low frequency oscillations in a single machine infinite bus, local and inter-area oscillations in multi-machine power systems. An adaptive fuzzy control integrates the sliding mode control (SMC) in the design of the proposed controller. The fuzzy logic system is used to approximate the unknown system function and by introducing proportional integral (PI) control term in the design of sliding mode controller in order to eliminate the chattering phenomenon. In addition, the parameters of the controller are optimized using particle swarm optimization (PSO) approach. Based on the Lyapunov theory, the adaptation laws are developed to make the controller adaptive take care of the changes due to the different operating conditions occurring in the power system and guarantees stability ...