-TRANSIENT STABILITY IMPROVEMENT OF MULTI MACHINE POWER SYSTEM USING UPFC TUNED-BASED PHASE ANGLE PARTICLE SWARM OPTIMIZATION

G. El-Saady, A. Ahmed, EL Noby and M. A. Mohammed

Abstract:

Optimal computation of parameters and placement of UPFC based minimization of New Voltage Stability Index (NVSI) are presented in this paper. The application of Unified Power Flow Controller (UPFC) to enhance transient stability of a multi-machine power system is listed. A supplementary stabilizer based on UPFC (like power system stabilizer) is designed to reach the defined purpose. Phase Angle Particle Swarm Algorithm (-PSO) is usedas an optimization method. Several nonlinear time-domain simulation tests visibly show UPFC capability in damping of power system oscillations and consequently transient stability betterment. Comparisons based system transient stability enhancement among different UPFC locations and parameters are introduced. The effectiveness of the proposed method is analyzed with IEEE 14-bus and IEEE 30-bus test systems.

Keywords:

Flexible AC Transmission System (FACTS), Unified Power Flow Controller (UPFC), Transient Stability, New Voltage Stability Index (NVSI), Phase Angle Particle Swarm Optimization (-PSO), Lead-Lag Power System Stabilizer (PSS), PI controllers.

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