



Dynamic Stability Enhancement for Multi-Machine Power System by Coordinated Design of PSS and SSSC

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Abstract:

Damping of inter-area power system oscillation is detrimental to the goals of maximum power transfer and optimal power system security. In this paper, individual and coordinated optimization of parameters for both static series synchronous compensator (SSSC) based damping controller and power system stabilizer (PSS) to enhance the power system damping are presented. A lead-lag stabilizer is used to demonstrate this technique. An optimization method based on simulated annealing (SA) algorithm is used for optimal parameters design of the SSSC stabilizer and PSS to improve the dynamic stability of the power system. Eigenvalue analysis is carried out to assess the effectiveness of the proposed stabilizers on enhancing the electromechanical mode stability. The effect of SSSC based stabilizers on damping inter-area oscillations for a small disturbance are studied and compared with PSS. Obtained results include eigenvalue analysis and non-linear time simulation for two area multi-machine power systems.

Keywords:

Dynamic stability, Simulated annealing, SSSC, PSS, Inter-area oscillation

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