

Desing of PSS and SVC to Improve Power System Stability

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Abstract : In this paper, the design and assessment of new coordination between Power System Stabilizers (PSSs) and Static Var Compensator (SVC) in a multimachine power system via statistical method are proposed. The coordinated design problem of PSSs and SVC over a wide range of loading conditions is handled as an optimization problem. The Bacterial Swarming Optimization (BSO), which synergistically couples the Bacterial Foraging (BF) with the Particle Swarm Optimization (PSO), is employed to seek for optimal controllers parameters. By minimizing the proposed objective function, in which the speed deviations between generators are involved; stability performance of the system is enhanced. To compare the capability of PSS and SVC, both are designed independently, and then in a coordinated manner. Simultaneous tuning of the BSO based coordinated controller gives robust damping performance over wide range of operating conditions and large disturbance in compare to optimized PSS controller based on BSO (BSOPSS) and optimized SVC controller based on BSO (BSOSVC). Moreover, a statistical T test is executed to validate the robustness of coordinated controller versus uncoordinated one.

Keywords : SVC, PSSs, multimachine power system, coordinated design, bacteria swarm optimization, statistical assessment

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