Power System Stability Enhancement Via Coordinated Design Of A PSS And An SVC-Based Controller

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Summary

Power system stability enhancement via robust coordinated design of a power system stabilizer (PSS) and a static VAR compensator (SVC)-based stabilizer is thoroughly investigated in this paper. The coordinated design problem of robust excitation and SVC-based controllers over a wide range of loading conditions and system configurations is formulated as an optimization problem with an eigenvalue-based objective function. The real-coded genetic algorithm (RCGA) is employed to search for optimal controller parameters. This study also presents a singular value decomposition (SVD) based approach to assess and measure the controllability of the poorly damped electromechanical modes by different control inputs. The damping characteristics of the proposed schemes are also evaluated in terms of the damping torque coefficient over a wide range of loading conditions. The proposed stabilizers are tested on a weakly-connected power system. The nonlinear simulation results and eigenvalue analysis show the effectiveness and robustness of the proposed approach.