Analysis Of Power System Stability Enhancement Via Excitation And Facts-Based Stabilizers

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Summary

Power system stability enhancement via excitation and FACTS-based stabilizers is thoroughly investigated in this paper. This study presents a singular value decomposition - based approach to assess and measure the controllability of the poorly damped electromechanical modes by different control inputs. The design problem of a power system stabilizer and different FACTS-based stabilizers is formulated as an optimization problem. An eigenvalue- based objective function to increase the system damping and improve the system response is developed. Then, a real-coded genetic algorithm is employed to search for optimal controller parameters. In addition, the damping characteristics of the proposed schemes are also evaluated in terms of the damping torque coefficient with different loading conditions for better understanding of the coordination problem requirements. The proposed stabilizers are tested on a weakly connected power system with different loading conditions. The damping torque coefficient analysis, nonlinear simulation results, and eigenvalue analysis show the effectiveness and robustness of the proposed control schemes over a wide range of loading conditions.

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