Genetic Algorithm Based Simultaneous Eigenvalue Placement Of Power Systems

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Summary

This paper demonstrates the use of genetic algorithms to design a single output feedback control law for the simultaneous eigenvalue placement of a power system running over a wide range of operating conditions. The task of selecting the output feedback gains is converted to a simple optimization problem with an eigenvalue-based objective function, which is solved by a genetic algorithm. An objective function is presented allowing the selection of the output feedback gains to place the closed-loop eigenvalues in the left-hand side of a vertical line in the complex s-plane while shifting a specific mode of oscillation to a vertical strip and with bounds on the damping ratio. Simultaneous placement of the closed-loop eigenvalues of the power system operating at different loading conditions, using a single output feedback stabilizer, is demonstrated. The effectiveness of the output feedback stabilizer in enhancing the dynamic stability of power systems is verified through eigenvalue analysis and simulation results.

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