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Optimal Design of Multi-Machine Power System Stabilizers Using Interactive Honey Bee Mating Optimization

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Abstract : This paper presents an enhanced Honey Bee Mating Optimization (HBMO) to solve the optimal design of multi machine power system stabilizer (PSSs) parameters, which is called the Interactive Honey Bee Mating Optimization (IHBMO). Power System Stabilizers (PSSs) are now routinely used in the industry to damp out power system oscillations. The design problem of the proposed controller is formulated as an optimization problem and IHBMO algorithm is employed to search for optimal controller parameters. The proposed method is applied to multi-machine power system (MPS). The method suggested in this paper can be used for designing robust power system stabilizers for guaranteeing the required closed loop performance over a prespecified range of operating and system conditions. The simplicity in design and implementation of the proposed stabilizers makes them better suited for practical applications in real plants. The non-linear simulation results are presented under wide range of operating conditions in comparison with the PSO and CPSS base tuned stabilizer one through FD and ITAE performance indices. The results evaluation shows that the proposed control strategy achieves good robust performance for a wide range of system parameters and load changes in the presence of system nonlinearities and is superior to the other controllers.

Keywords : power system stabilizer, IHBMO, multimachine, nonlinearities
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