

Damping Function and Dynamic Simulation of GUPFC Using IC-HS Algorithm

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Abstract : This paper presents a new dynamic simulation of a power system consisting of four machines equipped with the Generalized Unified Power Flow Controller (GUPFC) to improve power system stability. The dynamic simulation of the GUPFC consists of one shunt converter and two series converters based on voltage source converter, and DC link capacitor installed in the power system. MATLAB/Simulink is used to arrange the dynamic simulation of the GUPFC, where the power system is simulated in order to investigate the impact of the controller on power system oscillation damping and to show the simulation program reliability. The Improved Chaotic- Harmony Search (IC-HS) Algorithm is used to provide the parameter controller in order to lead-lag compensation design. The results obtained by simulation show that the power system with four machines is suitable for stability analysis. The use of GUPFC and IC-HS Algorithm provides the excellent capability in fast damping of power system oscillations and improve greatly the dynamic stability of the power system.

Keywords : GUPFC, IC-HS algorithm, Matlab/Simulink, damping oscillation

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