

Dynamic analysis, controlling chaos and chaotification of a SMIB power  
system

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Abstract

The dynamic behaviors of a SMIB power system are studied in this paper. A single modal equation is used to analyze the qualitative behaviors of the system. The famous equation of motion is called “swing equation”. The Lyapunov direct method is applied to obtain conditions of stability of the equilibrium points of the system. The bifurcation of the parameter dependent system is studied numerically. Besides, the phase portraits, the Poincare maps, and the Lyapunov exponents are presented to observe periodic and chaotic motions. Further, the addition of periodic force and the feedback control are used to control chaos effectively. Finally, the chaotification problem of the SMIB power system is also issued.

Keyword : Dynamic analysis,  
chaos, SMIB power system