Research of chaotic phenomenon for a synchronous reluctance motor

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Abstract. The paper presents the research of chaotic phenomenon for the synchronous reluctance motor. Chaotic phenomenon looks like confused but regular. Nonlinear characteristic of the system causes chaos happened. System parameters and initial value variations cause the result dramatically. We establish the synchronous reluctance motor chaos model, the equilibrium points and characteristic equation by motor model. We utilize the Routh-Hurwitz stability criterion to obtain speed controller parameters, and to calculate the initial value by computation of Lyapunov exponent to determine whether the system is in chaos behavior. We simulate it by using Matlab/Simulink software. Hardware achieved by using DS1104 processor board, which is the product of the dspace. Simulation and experiment results confirm the proposed theory is correct.