

The Stability of Chaos Synchronization of the Japanese Attractors and its
Application

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Abstract

The synchronization of chaos of the two identical chaotic motions of the Japanese attractor has been studied. First, the stability of the chaos synchronization of the systems is investigated by Liapunov' s direct method. Some sufficient conditions of global asymptotic synchronization are attained from rigorous mathematical theory. It has also been demonstrated numerically that applying two different kinds of one-way coupling technology can synchronize the two identical chaotic systems. The sign of the sub-Liapunov exponent has been used as an indicator for the occurrence of chaos synchronization. Chaos synchronization can be assured as shown well by phase trajectory. In addition, the chaotic signals are used to mask the message function in the secure communication system.

Keyword : Japanese attractor, stability, Liapunov' s direct method, chaos synchronization, one-way coupling, sub-Liapunov exponent, secure communication