# Synchronization of chaotic dynamical systems

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**Abstract**

Synchronization phenomena are universal and can be understood within a common framework based on modern nonlinear dynamics. The fact that chaotic systems may synchronize despite their sensitive dependence on initial conditions can be explained by the suppression of expanding dynamics in the state space transversal to the synchronization manifold. Some unidirectional coupling schemes are mainly based on global coupling forces. In this paper it is presented a unidirectional coupling procedure based in triangular applications. This procedure suppresses exponential divergence of the dynamics of the synchronization error and exploits the existing contraction properties of the given systems. The linear stability of the synchronous state is ensured in all points of the state space. An analysis of the local expanding directions can give important hints for the design of a global synchronization function and can also be used to evaluate the suitability of a given coupling signal for synchronization of two systems. The main properties and phenomena are illustrated with several numerical examples and figures.

Synchronization of chaotic dynamical systems has been the subject of curiosity and study in the last years. Our motivation for researching chaos synchronization techniques is to explore their practical application in various scientific areas.