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Synchronization in counter-rotating oscillators

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(Submitted on 28 Jun 2011)

An oscillatory system can have clockwise and anticlockwise senses of rotation. We propose a general rule how to obtain counter-rotating oscillators from the definition of a dynamical system and then investigate synchronization. A type of mixed synchronization emerges in counter-rotating oscillators under diffusive scalar coupling when complete synchronization and antisynchronization coexist in different state variables. Stability conditions of mixed synchronization are obtained analytically in Rossler oscillator and Lorenz system. Experimental evidences of mixed synchronization are given for limit cycle as well as chaotic oscillators in electronic circuits.

Submission history

From: Syamal Dana [view email]

[v1] Tue, 28 Jun 2011 11:17:55 GMT (545kb)

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