

Partial synchronization in a nearest-neighbor coupled Rössler system

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Synchronization of coupled chaotic systems has recently become a topic of great interest with the intent of realistically modelling spatially extended systems. For this purpose, coupled systems with local interactions are of significance. Complete synchronization of chaotic oscillators has been described theoretically and observed experimentally. But when the complete synchronization is broken, then another situation can emerge: partial synchronization, where some of the subsystems synchronize with each other and others do not. In this work, we consider a ring of six Rössler oscillators, each one coupled through its nearest-neighbors. We calculate the largest transversal Lyapunov exponent of the complete synchronization manifold to search the regions where that state is unstable. In these regions partial synchronization can show up and we corroborate it experimentally. Exploiting the symmetry of the system, we can know beforehand the possible synchronization patterns.

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