

Stability of the synchronization manifold in nearest neighbors non identical van der Pol-like oscillators

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We investigate the stability of the synchronization manifold in a ring and an open-ended chain of nearest neighbors coupled self-sustained systems, each self-sustained system consisting of multi-limit cycles van der Pol oscillators. Such model represents, for instance, coherent oscillations in biological systems through the case of an enzymatic-substrate reaction with ferroelectric behavior in brain waves model. The ring and open-ended chain of identical and non-identical oscillators are considered separately. By using the Master Stability Function approach (for the identical case) and the complex Kuramoto order parameter (for the non-identical case), we derive the stability boundaries of the synchronized manifold. We have found that synchronization occurs in a system of many coupled modified van der Pol oscillators and it is stable even in presence of a spread of parameters.

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