Synchronization and basin bifurcations in mutually coupled oscillators.

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Abstract

Synchronization behaviour of two mutually coupled double-well Duffing oscillators exhibiting cross-well chaos is examined. Synchronization of the subsystems was observed for coupling strength $k > 0.4$. It is found that when the oscillators are operated in the regime for which two attractors coexist in phase space, basin bifurcation sequences occur leading to $n + 1$, $n \geq 2$ basins as the coupling is varied — a signature of Wada structure and final-state sensitivity. However, in the region of complete synchronization, the basins structure is identical with that of the single oscillators and retains its essential features including fractal basin boundaries.

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