Oral(preferable)/Poster Presentation

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I would like to present our work on *Suppression of chaos through coupling to an external chaotic system* orally, but if got selected for poster presentation, then one more work I would like to present on *Dynamical effects of switching coupling forms*.

Title Suppression of chaos through coupling to an external chaotic system

Abstract We explore the behaviour of an ensemble of chaotic oscillators diffusively coupled only to an external chaotic system, whose intrinsic dynamics may be similar or dissimilar to the group. Counter-intuitively, we find that a dissimilar external system manages to suppress the intrinsic chaos of the oscillators to fixed point dynamics, at sufficiently high coupling strengths. So, while synchronization is induced readily by coupling to an identical external system, control to fixed states is achieved only if the external system is dissimilar. We quantify the efficacy of control by estimating the fraction of random initial states that go to fixed points, a measure analogous to basin stability. Lastly, we indicate the generality of this phenomenon by demonstrating suppression of chaotic oscillations by coupling to a common hyper-chaotic system. These results then indicate the easy controllability of chaotic oscillators by an external chaotic system, thereby suggesting a potent method that may help design control strategies.

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Title Dynamical effects of switching coupling forms

Abstract We explore the dynamical consequences of switching the coupling form in a system of coupled oscillators. We consider two types of switching, one where the coupling function changes periodically and one where it changes probabilistically. We find, through bifurcation diagrams and Basin Stability analysis, that there exists a window in coupling strength where the oscillations get suppressed. Beyond this window, the oscillations are revived again. A similar trend emerges with respect to the relative predominance of the coupling forms, with the largest window of fixed point dynamics arising where there is balance in the probability of occurrence of the coupling forms. Further, significantly, more rapid switching of coupling forms yields larger regions of oscillation suppression. Lastly, we propose an effective model for the dynamics arising from switched coupling forms and demonstrate how this model captures the basic features observed in numerical simulations and also offers an accurate estimate of the fixed point region through linear stability analysis.

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