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Title:	Control of hierarchical networks by coupling to an external chaotic system
Authors:	Chaurasia, S.S. (/jspui/browse?type=author&value=Chaurasia%2C+S.S.) Sinha, Sudeshna (/jspui/browse?type=author&value=Sinha%2C+Sudeshna)
Keywords:	Chaotic Oscillators Hierarchical networks
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Abstract:	We explore the behaviour of chaotic oscillators in hierarchical networks coupled to an external chaotic system whose intrinsic dynamics is dissimilar to all the oscillators in the network. We find that coupling to one such dissimilar external system manages to suppress the chaotic dynamics of all the oscillators at all levels of the network, at sufficiently high coupling strength. The chaos suppression is independent of the system size and occurs irrespective of whether the connection to the external system is direct, or indirect through oscillators at another level in the hierarchy. Though the steady states vary across different tiers, the oscillators are synchronized to the same steady state at a particular level of hierarchy. Lastly, we quantify the efficacy of control by estimating a global stability measure analogous to the basin stability of the emergent steady state. Our quantitative results explicitly indicate the easy controllability of hierarchical networks of chaotic oscillators by one dissimilar chaotic system, thereby suggesting a potent method that may help design control strategies.
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