Title:	Time-varying multiplex network: Intralayer and interlayer synchronization
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Abstract:	A large class of engineered and natural systems, ranging from transportation networks to neuronal networks,are best represented by multiplex network architectures, namely a network composed of two or more differentlayers where the mutual interaction in each layer may differ from other layers. Here we consider a multiplexnetwork where the intralayer coupling interactions are switched stochastically with a characteristic frequency.We explore the intralayer and interlayer synchronization of such a time-varying multiplex network. We find thatthe analytically derived necessary condition for intralayer and interlayer synchronization, obtained by the masterstability function approach, is in excellent agreement with our numerical results. Interestingly, we clearly findthat the higher frequency of switching links in the layers enhances both intralayer and interlayer synchrony,yielding larger windows of synchronization. Further, we quantify the resilience of synchronous states againstrandom perturbations, using a global stability measure based on the concept of basin stability, and this revealsthat intralayer coupling strength is most crucial for determining both intralayer and interlayer synchrony. Lastly,we investigate the robustness of interlayer synchronization against a progressive demultiplexing of the multiplexstructure, and we find that for rapid switching of intralayer links, the interlayer synchronization persists evenwhen a large number of interlayer nodes are disconnected
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