

Enhancing synchronization in growing networks

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Most real systems are growing. In order to model the evolution of real systems, many growing network models have been proposed to reproduce some specific topology properties. As the structure strongly influences the network function, designing the function-aimed growing strategy is also a significant task with many potential applications. In this letter, we focus on synchronization in the growing networks. In order to enhance the synchronizability during the network evolution, we propose the Spectral-Based Growing (SBG) strategy. Based on the linear stability analysis of synchronization, we show that our growing mechanism yields better synchronizability than the existing topology-aimed growing strategies in both artificial and real-world networks. We also observe that there is an optimal degree of new added nodes, which means adding nodes with neither too large nor too low degree could enhance the synchronizability. Furthermore, some topology measurements are considered in the resultant networks. The results show that the degree, node betweenness centrality from SBG strategy are more homogenous than those from other growing strategies. Our work highlights the importance of the function-aimed growth of the networks and deepens our understanding of it.

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