Synchronization of Each Connection in Coupled Chaotic Circuits

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Summary

Synchronization phenomena can be observed everywhere in our life. For example, we can confirm metronome, flashing firefly lights, beating rhythm of the heart and so on. Especially, synchronization phenomena of oscillatory network are interesting. In addition, complex networks attract attention from various fields. The feature of networks is characterized by the degree distribution, the path length and the clustering coefficient. Complex networks of chaotic circuits have been studied [1]. However, many researchers have not been researched more about synchronization phenomena in complex networks of coupled chaotic circuits which compare degree distribution.

In this study, we compare synchronization phenomena of networks with three types of degree distribution. Complex networks of real world have characters like scale free property, cluster property, small world property [2][3]. So, we use degree distribution models based on the power law and the normal distribution. Scale free network follows the power law. Random network follows the normal distribution. Especially, scale free network has hub nodes which have many edges. We compare synchronization rate of network based on three types of degree distribution by changing the coupling strength. And we investigate synchronization phenomena between each connection of networks. In this result, high synchronization was obtained between nodes have many edges, in other words, synchronization rate between hub nodes is higher than that of others.

References

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