

## Spread of Chaotic Behavior in Coupled Chaotic Circuits with Hub Network

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### Summary

In our society, various type networks which is held on propagation have attracted a great deal of attention from various fields [1]. These network models have various types of feature quantities. Examples of feature quantities are path length, degree distribution, and clustering coefficient. Moreover, there are many types of propagation in the real network. For example, the traffic jam of the transportation network and the pandemic outbreak of malaria are mentioned. Hence, since network models become more complex and large scale network, it is more difficult to analyze the phenomena in the networks. However, there are not many studies of large- scale network of continuous-time real physical systems such as electrical circuits. Therefore, we consider that we can analyze various complicated phenomena of complex networks by investigating the spread of chaotic behavior.

In our previous studies, we have investigated synchronization phenomena in various types of network [2]. On the other hand, there is scarcely research results in complex networks. Chaos propagation have been investigated in simple networks such as a ring combination [3],[4]. In this study, we investigate the spread of chaotic behavior in coupled chaotic circuits with hub network. We proposed complex network models. These proposed models use chaotic circuits which is called Nishio-Inaba circuit [5]. One circuit is set to generate chaotic attractor and the other circuits are set to generate three-periodic attractors. First, we investigate ratio of spreading chaotic behavior in complex network with or without hubs. Moreover, we investigate the spread of chaotic behavior in large- scale network with hubs. From the result, we confirm the spread of chaotic behavior becomes weak in complex network with hub.

### References

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