

# Chaos Propagation in Coupled Chaotic Circuits as Multi-Ring with Hub Network

Takahiro Chikazawa, Yoko Uwate and Yoshifumi Nishio

†Dept. of Electrical and Electronic Engineering, Tokushima University,  
2-1 Minamijosanjima, Tokushima, 770-8506 Japan  
Email: {chikazawa, uwate, nishio}@ee.tokushima-u.ac.jp

## Summary

Propagation in the network have attracted a great deal of attention from various fields. It is important to investigate chaos propagation under some difficult situations for the circuits. For example of some difficult situations, network of briefly given external stimulation and frustration is occurred in the network. Furthermore, viral infection and the traffic jam of the transportation network are mentioned as an example of propagation in the network. In the biology, we can prevent the unknown virus spreading if we comprehend the way of viral infections. Additionally, it is applicable to the fields of medical science and biology and so on. However, there are not many studies of large-scale network of continuous-time real physical systems such as electrical circuits.

In this study, we investigate chaos propagation in coupled chaotic circuits with multi-ring combination. We compare the different coupling combination. These models are coupled chaotic circuits when one circuit is set to generate chaotic attractor and the other circuits are set to generate three-periodic attractors. By using computer simulations, we have observed that the chaotic attractor is propagated to the other circuits. The three-periodic attractors are affected from the chaotic attractors by changing the coupling combination and increasing the coupling strength. Moreover, we confirm that chaos propagation of the network without hub is faster than the network with hub.