Faculty of Engineering
Tokushima University

Engineering Applications of Chaos

Professor Yoshifumi Nishio

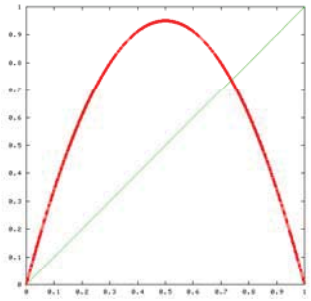

Fig. 1: Logistic map, one of the most famous one-dimensional map generating chaos.

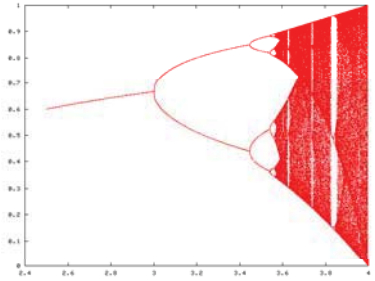

Fig. 2: One-parameter bifurcation diagram of the Logistic map.

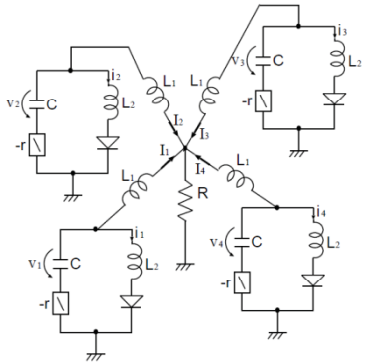

Fig. 3: Four autonomous chaotic circuits coupled by one resistor.

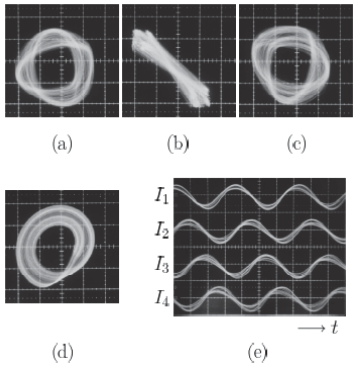

Fig. 4: Four-phase quasi-synchronization of chaos observed from the circuits in Fig. 3.

Content:

1. Chaos Cryptosystems

   Sensitive dependence of chaos on initial conditions and parameters is exploited for various security issues.

2. Chaos Communication Systems

   Continuity of chaotic sequences generated from an identical chaotic map is exploited to recover data correctly.

3. Complex Networks

   Various synchronization phenomena in coupled chaotic circuits are good models of various complex networks.

4. Nonlinear Time Series Analysis

   Chaos analysis is utilized to predict a trend of nonlinear time series or to diagnose medical signals.

5. Data Mining

   Self-organizing feature of artificial neural networks is exploited to carry out clustering of various data.

Keywords: chaos, chaos cryptosystems, chaos communication systems, complex systems, nonlinear time series analysis

E-mail: nishio@ee.tokushima-u.ac.jp>
Tel. +81-88-656-7470
Fax: +81-88-656-7471
HP : http://nlab.ee.tokushima-u.ac.jp/nishio.htm