

Chaotic Circuits Using Some Kinds of Ring Oscillators

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SUMMARY

An IC implementation of chaotic circuits is needed for investigations of coupled chaotic systems. However, many money and time are needed for the IC implementation. Therefore, the chaotic circuit which can be implemented as IC and can be also implemented as normal electric circuit is needed. A ring oscillator which consists of simple inverter circuits is suitable for it. By constructing chaotic circuits using ring oscillators, the IC implementation becomes easy.

In this study, we investigated chaotic circuits using some kinds of ring oscillators as shown in Fig. 1. Circuit experiments and computer simulations were carried out. By using simple models, exact solutions and Jacobian matrixes were derived. Poincaré maps and Lyapunov exponents were calculated by Jacobian matrixes. As a result, generations of chaos in all circuits were confirmed.

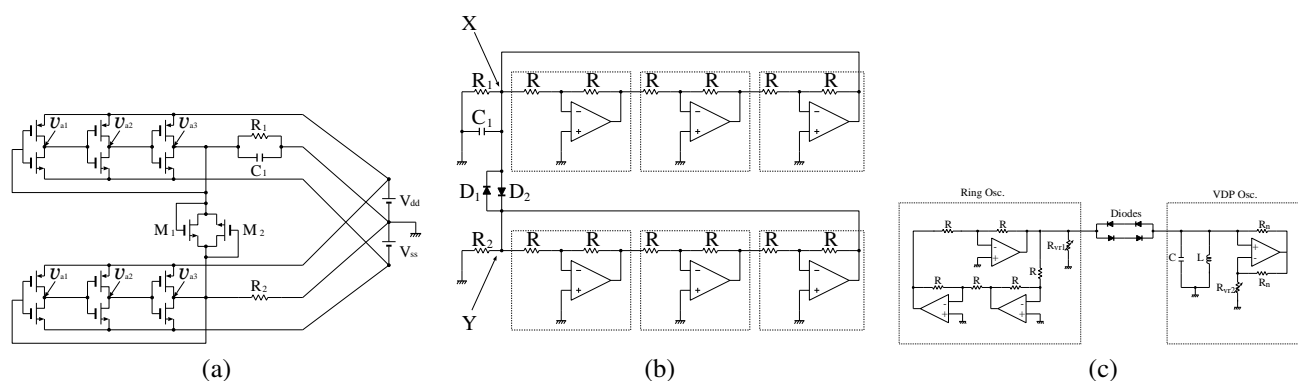


Fig. 1. Circuit schematics

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