

Broadband hyperchaotic oscillator with delay line - DTU Orbit (09/11/2017)

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Dynamical systems with time delay can be employed as high dimensional hyperchaotic oscillators with multiple positive Lyapunov exponents. We describe an electronic circuit composed of a 3-stage amplifier and a delay line in the feedback loop. The 1st stage of the amplifier is a nonlinear one while the 2nd and the 3rd stages are linear ones. Microwave transistors having the threshold frequency 5 to 9 GHz are used in the experimental circuits. The oscillators generate hyperchaotic signals in the frequency range from about 1 MHz to more than 100 MHz with unevenness of the spectral density less than 20 dB. Mathematical models are presented. The oscillators are described either by a scalar nonlinear DDE or by a set combined of one nonlinear DDE and two linear ODEs.

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