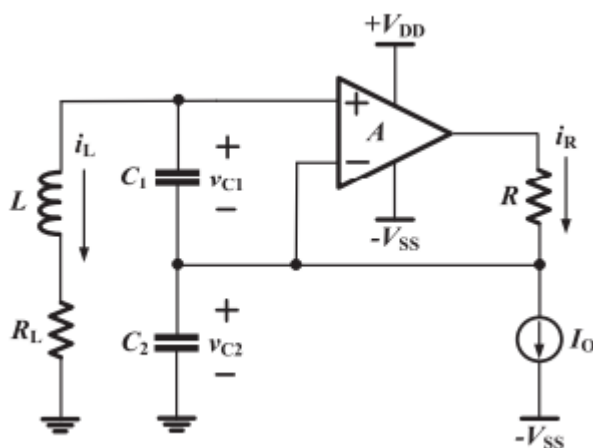


Current-reversible chaotic jerk circuit

Abstract :

A simple current-reversible chaotic jerk circuit is proposed and particularly demonstrates the use of inherently $\tanh(x)$ nonlinearity of a single opamp for a chaotic jerk circuit. No additionally nonlinear devices are required. Bifurcation is electronically tunable through a current source in a reversible direction. The largest Lyapunov exponent of either direction forms mirror images, whereas the chaotic attractor of either direction forms antisymmetric images.

Circuit Diagram:



Working:

The circuit shows a simple current-reversible chaotic jerk oscillator based on inherent $\tanh(x)$ of a single opamp. A resistor $R_L = R_1 + R_2$ where R_1 is an internal resistance of an inductor L and R_2 is an external resistor. Voltages v_{C1} and v_{C2} are across capacitors C_1 and C_2 , respectively. Currents i_L and i_R flow through L and a resistor R , respectively. A DC current source I_0 is connected to a DC voltage source V_{SS} . Let V_S be a saturation voltage of the opamp, and V_r be an arbitrary reference voltage = 1 V.

Applications:

- Cryptography.
- Wide Band communication system.
- Robotics- used to build passive walking biped robots.
- Biology- used in ecological systems such as Hydrology.