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# Chaos theory and arrhythmia: A dynamical approach to cardiac care

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## Abstract

The field of Nonlinear Dynamics has found a large number of applications in studying and recreating numerous phenomena encountered in nature, society, the sciences, and engineering. The simulation of such dynamics is therefore of great interest to sciences and industries alike. This paper details the process of emulating and transitioning between two of perhaps the most famous topologies of this field – namely, the Van Der Pol and the Lorenz-form Oscillators - through one active electronic circuit, commonly known as Chua's Circuit. This process is separated in three parts: Starting with an introduction to the mathematical background and apparatus involved, continuing to the construction and simulation of the circuit followed by an analysis of its operating regimes, and concluding with prominent applications and research prospects that could be made possible by such systems in the field of reanimation medicine.

**Keywords:** Dynamics, Oscillator, Chaos, Simulation.

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