Abstract Submitted
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Investigating the Applications of Chaotic Oscillators[1] PAUL BOULET, University of Dallas Undergraduate Physics Student, PAUL BOULET COLLABORATION[2] — Many distinct chaotic circuits were developed experimentally to create new, advanced, high-order chaotic systems. Inductor-capacitor (LC) transmission lines working in conjunction with a limiting factor (often a diode) were used to create higher-order differential waveforms in circuits. By lengthening the transmission lines, an easy and accessible way for creating higher-order systems was implemented. Chaos in these systems was observed through the use of analog oscilloscopes set to display the voltage waveform versus its derivative and also through digital oscilloscopes graphing the waveform. Most notably a generalized Rössler system was expanded from a sixth-order chaotic system to a never before achieved twelfth-order system. In addition, a second-order solvable exact shift chaotic oscillator was experimentally developed and was nearly progressed to a third order system. This research may be beneficial in creating higher-order chaotic systems as well as serving as the basis for the development of communication systems, reservoir computers, random number generators, and more advanced and efficient radars. We report on the techniques implemented to achieve these higher order chaotic systems.

[1]Aviation Missile Research Development and Engineering Centers (AMRDEC) College Qualified Leader (CQL) program, under the guidance of Research Physicist, Dr. Ned Corron.
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