The Lorenz Attractor and the Unified Language of Chaos Based on a Mechanical Experiment

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This presentation investigates fundamental aspects of chaos theory, specifically the phenomenon of the Lorenz attractor and its manifestation through a mechanical experiment. The presentation builds upon the pioneering work of Edward Lorenz, who demonstrated how a simple deterministic system can exhibit extremely complex and nonlinear behavior, known as the "butterfly effect" or sensitive dependence on initial conditions.

Beyond theoretical foundations, the presentation will showcase the results of a mechanical experiment conducted under laboratory conditions, aimed at demonstrating the principles of the Lorenz attractor. The experimental data will be compared with theoretical models, further confirming the universal language of chaos across diverse physical systems. Ultimately, this work underscores the significance of chaos theory as one of the most relevant and research-rich areas in modern science.