

## **Topic: Brief introduction to Non-linear system**

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Nonlinear dynamics is the study of systems and processes that exhibit complex behaviour and cannot be accurately described by linear mathematical models. It encompasses a wide range of phenomena, from chaotic systems and strange attractors to solitons and self-organizing systems. These types of systems are of interest because a lot of systems are inherently non-linear in nature ranging from the functioning of neurons to weather patterns. Such systems are susceptible to initial conditions, and their dynamics can be unpredictable or chaotic compared to linear systems. In this presentation, discussions will be aligned basically on the Lorenz equations, their dynamics and behaviour. The Lorenz model is considered a benchmark system in chaotic dynamics in that it displays extraordinary sensitivity to initial conditions and the strange attractor phenomenon.

Reference:

1. Edward N. Lorenz, 1963, *Deterministic Non periodic flow*, Journal of Atmospheric Science, Vol. 20, pp 130-141
2. *Non-linear dynamics and Chaos*, Steven Strogatz, 2015, CRC Press.