NPTEL Video Course - Electrical Engineering - Nonlinear Dynamical Systems

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Co-ordinating Institute - IIT - Bombay

Sub-Titles - Available / Unavailable | MP3 Audio Lectures - Available / Unavailable

Lecture 1 - Introduction
Lecture 2 - First Order systems
Lecture 3 - Classification of Equilibrium points
Lecture 4 - Lipschitz Functions
Lecture 5 - Existence/uniqueness theorems
Lecture 6 - Existence/uniqueness of solutions to differential equations
Lecture 7 - Lyapunov theorem on stability
Lecture 8 - Extension of Lyapunov's Theorem in different contexts
Lecture 9 - LaSalle's Invariance principle, Barbashin and Krasovski theorems, periodic orbits
Lecture 10 - Bendixson criterion and Poincare-Bendixson criterion. Example
Lecture 11 - Bendixson and Poincare-Bendixson criteria van-der-Pol Oscillator
Lecture 12 - Scilab simulation of Lotka Volterra predator prey model, van-der-Pol Oscillator Review of linear
Lecture 13 - Signals, operators
Lecture 14 - Norms of signals, systems (operators), Finite gain L2 stable
Lecture 15 - Nyquist plots and Nyquist criterion for stability
Lecture 16 - Interconnection between linear system & non-linearity, passive filters
Lecture 17 - Passive filters, Dissipation equality, positive real lemma
Lecture 18 - Positive real lemma proof
Lecture 19 - Definition for positive realness and Kalman Yakubovich-Popov Theorem
Lecture 20 - Kalman-Yakubovich-Popov Lemma/theorem and memoryless nonlinearities
Lecture 21 - Loop tranformations and circle criterion
Lecture 22 - Nonlinearities based on circle criterion
Lecture 23 - Limit cycles
Lecture 24 - Popov criterion continuous, frequency-domain theorem
Lecture 25 - Popov criterion continuous, frequency-domain theorem
Lecture 26 - Describing function method
Lecture 27 - Describing Function
Lecture 28 - Describing
Lecture 29 - Describing

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Lecture 30 - Describing functions
Lecture 31 - Describing functions
Lecture 32 - Describing functions for nonlinearities
Lecture 33 - Ideal relay with Hysteresis and dead zone
Lecture 34 - Dynamical systems on manifolds-1
Lecture 35 - Dynamical systems on manifolds-2
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