

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

NPTEL Video Course - Electrical Engineering - NOC:Introduction to Time - Varying Electrical Networks

Subject Co-ordinator - Prof. Shanthi Pavan

Co-ordinating Institute - IIT - Madras

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

Lecture 1 - Course Introduction and Motivation  
Lecture 2 - Kirchoff's Current and Voltage Laws, and the Incidence Matrix  
Lecture 3 - Power Conservation and Tellegen's Theorem  
Lecture 4 - Intuition behind Tellegen's Theorem  
Lecture 5 - Tellegen's Theorem and reciprocity in linear resistive networks  
Lecture 6 - Why is reciprocity useful in practice?  
Lecture 7 - Inter-reciprocity in linear time-invariant networks  
Lecture 8 - Inter-reciprocity in linear time-invariant networks (Continued...)  
Lecture 9 - Inter-reciprocity in networks with ideal operational amplifiers  
Lecture 10 - Review of Modified Nodal Analysis (MNA) of linear networks  
Lecture 11 - MNA stamps of controlled sources - the VCCS and VCVS  
Lecture 12 - MNA stamps of controlled sources - the CCCS and CCVS  
Lecture 13 - Inter-reciprocity in linear networks - using the MNA stamp approach  
Lecture 14 - The Adjoint Network  
Lecture 15 - MNA stamp of an ideal opamp  
Lecture 16 - Properties of circuits with multiple ideal opamps  
Lecture 17 - Introduction to noise in electrical networks  
Lecture 18 - Noise processed by a linear time-invariant system  
Lecture 19 -  $kT/C$  noise in a sample-and-hold circuit  
Lecture 20 - Noise in RLC networks  
Lecture 21 - Total integrated noise in RLC Networks  
Lecture 22 - Bode's Noise Theorem - Frequency domain  
Lecture 23 - Input referred noise in electrical networks - Part 1  
Lecture 24 - Input referred noise in electrical networks - Part 2  
Lecture 25 - Input referred noise and the noise factor  
Lecture 26 - Noise Factor Examples  
Lecture 27 - Motivation to learn about time-varying circuits and systems - Part 1  
Lecture 28 - Motivation to learn about time-varying circuits and systems - Part 2  
Lecture 29 - Convolution integral for LTV systems

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## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

- Lecture 30 - Frequency response of an LTV system
- Lecture 31 - LTV system example : Time-varying RC filter
- Lecture 32 - Linear Periodically Time-Varying Systems (LPTV)
- Lecture 33 - Response of an LPTV system to a complex exponential input
- Lecture 34 - Harmonic Transfer Functions
- Lecture 35 - Zadeh expansion of an LPTV system
- Lecture 36 - MNA analysis of LPTV networks
- Lecture 37 - MNA stamp of a periodically time varying conductance
- Lecture 38 - MNA stamp of a capacitor and a voltage source in an LPTV network
- Lecture 39 - Analysis of an example LPTV network - Part 1
- Lecture 40 - Analysis of an example LPTV network - Part 2
- Lecture 41 - LPTV network analysis, RC filter, time-varying
- Lecture 42 - Impedance and admittance in LTI and LPTV networks
- Lecture 43 - Thevenin and Norton's Theorems for LPTV networks
- Lecture 44 - The N-path principle
- Lecture 45 - N-path example
- Lecture 46 - Time-domain intuition of the N-path principle
- Lecture 47 - N-path example: Time-Interleaved ADCs
- Lecture 48 - Dc-dc converter as an LPTV system
- Lecture 49 - N-path principle: Multiphase dc-dc converter
- Lecture 50 - The N-path filter
- Lecture 51 - Computing  $H_0(j2\pi f_s)$  for a 4-path filter
- Lecture 52 - Input impedance of the 4-path filter at  $f_s$
- Lecture 53 - Computing  $H_0(j2\pi 2 f_s)$  for a 4-path filter
- Lecture 54 - Determining  $H_0$  for input frequency deviations from  $f_s$
- Lecture 55 - Reciprocity and Inter-reciprocity in LPTV networks : Part 1
- Lecture 56 - Reciprocity and Inter-reciprocity in LPTV networks : Part 2, the transfer-function theorem
- Lecture 57 - Why is the transfer-function theorem important?
- Lecture 58 - The frequency-reversal theorem for inter-reciprocal (adjoint) LPTV networks : introduction
- Lecture 59 - The frequency-reversal theorem for inter-reciprocal (adjoint) LPTV networks : derivation
- Lecture 60 - Why is the frequency-reversal theorem important?
- Lecture 61 - Inter-reciprocity in signal-flow graphs
- Lecture 62 - Applications of inter-reciprocity: analysis of chopped amplifiers
- Lecture 63 - Applications of inter-reciprocity: analysis of chopped amplifiers (Continued...)
- Lecture 64 - Applications of inter-reciprocity: chopping with square-wave modulation
- Lecture 65 - Applications of inter-reciprocity: the switched-RC network
- Lecture 66 - Time-domain implications of inter-reciprocity and the adjoint network
- Lecture 67 - Time-domain implications of inter-reciprocity and the adjoint network : Example calculation
- Lecture 68 - LPTV networks with sampled outputs: Switched capacitor circuits

## NPTEL Video Lecture Topic List - Created by LinuXpert Systems, Chennai

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- Lecture 69 - LPTV networks with sampled outputs: A continuous-time delta-sigma data converter
- Lecture 70 - LPTV networks with sampled outputs: The equivalent LTI filter
- Lecture 71 - Finding the equivalent LTI filter of a sampled LPTV system : example
- Lecture 72 - Equivalent LTI filter for a switched-RC network
- Lecture 73 - Finding the equivalent LTI filter of a sampled LPTV system : example of a continuous-time delta-
- Lecture 74 - Finding the equivalent LTI filter of a sampled LPTV system with offset sampling
- Lecture 75 - LPTV networks driven by modulated inputs
- Lecture 76 - Introduction to noise in LPTV Networks
- Lecture 77 - Noise in LPTV networks with sampled outputs
- Lecture 78 - Total integrated noise in networks with R,L,C and periodically operated switches