

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

NPTEL Video Course - Mechanical Engineering - NOC:Muffler Acoustics - Application to Automotive Exhaust Noise

Subject Co-ordinator - Prof. Akhilesh Mimani

Co-ordinating Institute - IIT - Kanpur

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

- Lecture 1 - Introduction to Acoustic Wave Propagation
- Lecture 2 - D'Alemberts's solution and 1-D Continuity equation
- Lecture 3 - Muffler Acoustics-Application to Automotive Exhaust Noise Control
- Lecture 4 - Linearization of governing equations, and Development of 1-D Acoustic wave and Helmholtz equation
- Lecture 5 - Solution of 1-D Helmholtz equation: Propagation in 1-D ducts/pipes
- Lecture 6 - 1-D Acoustic Wave Equation in Ducts Carrying Uniform Mean Flow: Derivation
- Lecture 7 - 1-D Acoustic Wave Equation in Ducts Carrying Uniform Mean Flow: Solution
- Lecture 8 - 3-D Acoustic Wave Equation in Rectangular and Circular Waveguides: Derivation, Modal Solution and
- Lecture 9 - Sound Pressure Level, Intensity Level and Sound Power Level
- Lecture 10 - Acoustic Impedance and Reflection Coefficient
- Lecture 11 - Lumped System Analysis: Inertance and Compliance
- Lecture 12 - Lumped Analysis of a Uniform Pipe Closed/Open at an End, Concept of End Correction
- Lecture 13 - Helmholtz Resonator, Electro-Acoustic Analogy and Layout of a typical engine exhaust system
- Lecture 14 - Muffler Performance Measures: Insertion Loss
- Lecture 15 - Muffler Performance Measures: Transmission Loss and Level Difference
- Lecture 16 - Lumped Analysis of a Tube, Simple Area Discontinuity and Transfer Matrices
- Lecture 17 - Sudden area Discontinuity (Continued...)
- Lecture 18 - Simple Expansion Chamber Analysis Using Transfer Matrix Method
- Lecture 19 - Transmission Loss (TL) Graph for a Simple Expansion Muffler (MATLAB)
- Lecture 20 - Extended-Inlet and Extended-Outlet Muffler Analysis
- Lecture 21 - Extended-Inlet and Extended-Outlet Muffler Analysis (Continued...)
- Lecture 22 - TL Analysis of Extended-Inlet and Extended-Outlet Muffler (MATLAB)
- Lecture 23 - TL Analysis of Side-Inlet and Side-Outlet Muffler Using Transfer Matrix Method
- Lecture 24 - Wave Propagation in Gradually Varying Area Ducts: Webster's Horn Equation
- Lecture 25 - Webster's Horn Equation (Continued...) and Exponential Ducts
- Lecture 26 - Solution of Webster's Horn Equation for Conical Ducts
- Lecture 27 - TL analysis for Conical Muffler Configurations (MATLAB)
- Lecture 28 - Segmentation Approach for Analysing Gradually Varying Area Ducts (MATLAB)
- Lecture 29 - Acoustic Intensity (Energy Flux) in a Pipe with Mean Flow, and Transmission Loss Expression

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- Lecture 30 - Aeroacoustic State Variables Transfer Matrix for a Tubular Element (Uniform Pipe)
- Lecture 31 - Transfer Matrix for Extended-Inlet and Outlet Element and Use of Perforated Elements in Commercial Configurations
- Lecture 32 - Two-interacting Duct Configurations: Development of Equations and Concentric Tube Resonators
- Lecture 33 - Concentric Tube Resonator: Partially Perforated Pipe or Airway (MATLAB)
- Lecture 34 - Review of Perforate Impedance Expressions
- Lecture 35 - MATLAB Demonstration for Fully and Partially Perforated CTR
- Lecture 36 - Cross-Flow elements: Setting-up the Equations
- Lecture 37 - Cross-Flow elements: MATLAB Demonstration for Simple Configurations
- Lecture 38 - Plug Mufflers, Three-pass Perforated Element Muffler (Commercial Configurations) - MATLAB
- Lecture 39 - Multiply-Connected Mufflers: HQ Tubes
- Lecture 40 - TL Analysis of HQ Tubes (MATLAB): Network Analysis and Analytical Formula
- Lecture 41 - Transmission Loss in terms of Scattering and Impedance Matrix Parameters
- Lecture 42 - Rectangular Chamber Muffler: Characterization and TL Analysis using 3-D Piston-driven Model
- Lecture 43 - Circular Chambers: Characterization and TL Analysis Using 3-D Piston-driven Model
- Lecture 44 - Analytical Mode-Matching for Extended-Inlet and Outlet Muffler: Setting-up of the Equations
- Lecture 45 - MATLAB Demonstration for Transmission Loss Calculations
- Lecture 46 - Dissipative Mufflers (Lined Circular duct) - A Brief Discussion
- Lecture 47 - Summary of the Topics Covered in This Course, Topics to be Covered in a Future Course