

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

NPTEL Video Course - Mechanical Engineering - NOC:Robotics: Basics and Selected Advanced Concepts

Subject Co-ordinator - Prof. Ashitava Ghosal

Co-ordinating Institute - IISc - Bangalore

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

Lecture 1 - Introduction, Types and Classification of Robots

Lecture 2 - Main Elements of a Robot

Lecture 3 - Modelling and Analysis of Robots

Lecture 4 - Mathematical Preliminaries, Homogeneous Transformations

Lecture 5 - Elements of robot - Joints, Elements of robots - Links

Lecture 6 - Examples of D-H parameters and Link transformation matrices

Lecture 7 - Introduction, Direct Kinematics of Serial Robots

Lecture 8 - Inverse Kinematics of Serial Robots

Lecture 9 - Inverse Kinematics of Serial Robots with $n < 6$, Inverse Kinematics of Serial Robots with $n > 6$

Lecture 10 - Elimination Theory and Solution of Non-linear Equations, Inverse Kinematics of a General 6R Robot

Lecture 11 - Introduction, Loop-closure Equations

Lecture 12 - Direct Kinematics of Parallel Manipulators

Lecture 13 - Mobility of Parallel Manipulators

Lecture 14 - Inverse Kinematics of Parallel Manipulators

Lecture 15 - Direct Kinematics of Stewart Platform Manipulators

Lecture 16 - Sun tracking using 3-DOF parallel manipulator

Lecture 17 - Stewart-Gough platform-based force-torque sensor

Lecture 18 - Vibration isolation using a Stewart-Gough platform

Lecture 19 - Introduction, Linear and Angular Velocity of Links

Lecture 20 - Serial Manipulator Jacobian Matrix

Lecture 21 - Parallel Manipulator Jacobian Matrix

Lecture 22 - Singularities in Serial and Parallel Manipulators

Lecture 23 - Statics of Serial and Parallel Manipulators

Lecture 24 - Hyper-redundant robots

Lecture 25 - Redundancy resolution in human arm

Lecture 26 - Flexible robots

Lecture 27 - Introduction, Lagrangian formulation

Lecture 28 - Examples of Equations of Motion

Lecture 29 - Inverse Dynamics and Simulation of Equations of Motion

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- Lecture 30 - Recursive Formulations of Dynamics of Manipulators
- Lecture 31 - Motion planning
- Lecture 32 - Control of a single link
- Lecture 33 - Control of a multi-link serial manipulator
- Lecture 34 - Control of a multi-link manipulator
- Lecture 35 - Control of constrained and parallel manipulator, Cartesian control of serial manipulators
- Lecture 36 - Force control of manipulators, Hybrid position/force control of manipulators
- Lecture 37 - Advanced topics in non-linear control of manipulators
- Lecture 38 - Wheeled Mobile Robots (WMR) on Flat Terrain
- Lecture 39 - Wheeled Mobile Robots (WMR) on Uneven Terrain
- Lecture 40 - Kinematics and Dynamics of WMR on Uneven Terrain
- Lecture 41 - Over-Constrained Mechanism and Deployable Structures
- Lecture 42 - Kinematic and Static Analysis