

Brief schedule of workshop

Introduction to Roboanalyzer, developers (5 min)

Brief listing of functionalities of Roboanalyzer (5 min)

- Serial manipulator with prismatic and revolute joints
- DH parameters as input
- 3D model generated based on DH parameters
- Visualize DH parameters
- Homogenous Transformations
- Forward Kinematics
- Inverse Kinematics
- Inverse Dynamics (Based on ReDySim Algorithm)
- Forward Dynamics (Based on ReDySim Algorithm)
- Animation with trace of end-effector
- Plot graphs
- Virtual Robot Module (17+ CAD Models of Industrial Robots)

Virtual Robot Module, a part of RoboAnalyzer, has been developed as an application which has joint and Cartesian motion. It has also been made as a COM server, using which one can integrate VRM with MATLAB, MS Excel and other applications that has a COM interface. It also has been integrated with Robotics Toolbox for MATLAB by Prof. Peter Corke of QUT, Australia.

1. Joint-level jogging
 2. Cartesian-level jogging
 3. Cartesian straight line motion
 4. Integration with MATLAB (Robotics Toolbox) and MS Excel
- Save and Open Robot Models
 - Motion Planning

Downloading and installing software V7.5 from site (if not done yet) (5 min)

Installing .NET 4.5 (and dependencies, if any)

Homogenous Transformation Matrix (HTM) Module

Task 1: Translation in HTM (5min)

Task 2: Rotation in HTM (10 min)

Task 3: Local v/s Global in HTM (10 min)

Geometric model of robot and DH parameters. Demo of DH visualization (10+10=20 min)

Forward kinematics

Task 4: Transformations and DH visualization (10 min)

Task 5: Forward kinematics and motion planning (5 min)

Inverse kinematics demo (5 min)

Task 6: Inverse kinematics of MTAB Aristo (5 min)

Virtual robot module

Demo: Joint jogging (5 min)

Demo: Cartesian jogging (5 min)

Task 7: Exercise in VRM (10 min)

Inverse dynamics demo (5 min)

Task 8: Inverse dynamics for a 2R serial robot with cycloidal trajectory (10 min)

Forward dynamics demo (5 min)

Task 9: Freefall simulation of a simple pendulum (10 min)

Questionnaire (15 min)**Feedback (5 min)**

Total duration: 2 h 30 min