JYOTHISHMATHI INSTITUTE OF TECHNOLOGY AND SCIENCE, NUSTULAPUR, KARRIMNAGAR-27

Robotics

(Configuration)

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Industrial Robotics

- Robots are devices that are programmed to move parts, or to do work with a tool.
- Robotics is a multidisciplinary engineering field dedicated to the development of autonomous devices, including manipulators and mobile vehicles.
- Roboticis develop man-made mechanical devices that can move by themselves, whose motion must be modelled, planned, sensed, actuated and controlled, and whose motion behaviour can be influenced by “programming”. Robots are called “intelligent” if they succeed in moving in safe interaction with an unstructured environment, while autonomously achieving their specified tasks

DEFINITION

- The term comes from a Czech word, *robota, meaning "forced labor." The* word *robot first appeared in a 1920 play by Czech writer Karel Capek, R.U.R.: Rossum's* Universal Robots. In the play, the robots eventually overthrow their human creators.

- ***End Effectors: A hand of a robot is considered as end effectors. The grippers***
- ***Robot Joints: The joints in an industrial robot are helpful to perform sliding***
- ***Manipulator: The manipulators in a robot are developed by the integration of***
- ***Kinematics: It concerns with the assembling of robot links and joints. It is***

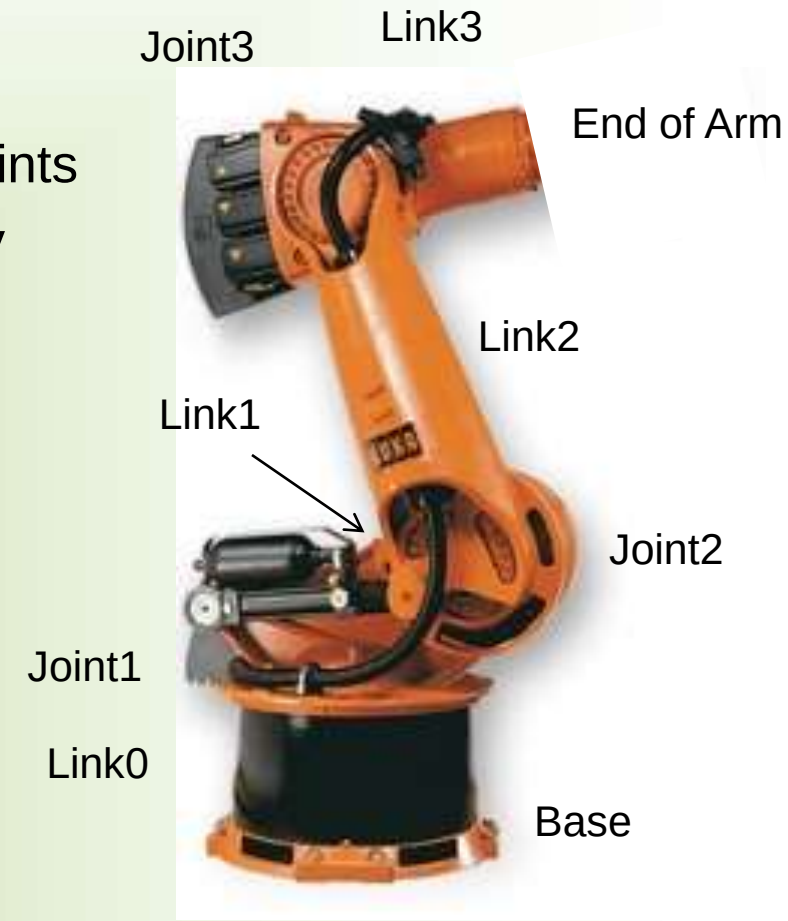
Industrial Robot Defined

A general-purpose, programmable machine possessing certain anthropomorphic characteristics

- Hazardous work environments
- Repetitive work cycle
- Consistency and accuracy
- Difficult handling task for humans
- Multishift operations
- Reprogrammable, flexible
- Interfaced to other computer systems

Robot Anatomy

- Manipulator consists of joints and links
  - Joints provide relative motion
  - Links are rigid members between joints
  - Various joint types: linear and rotary
  - Each joint provides a “degree-of-freedom”
  - Most robots possess five or six degrees-of-freedom
- Robot manipulator consists of two sections:
  - Body-and-arm – for positioning of objects in the robot's work volume
  - Wrist assembly – for orientation of objects



Power point presentation (PPT)

on

ROBOTICS

by
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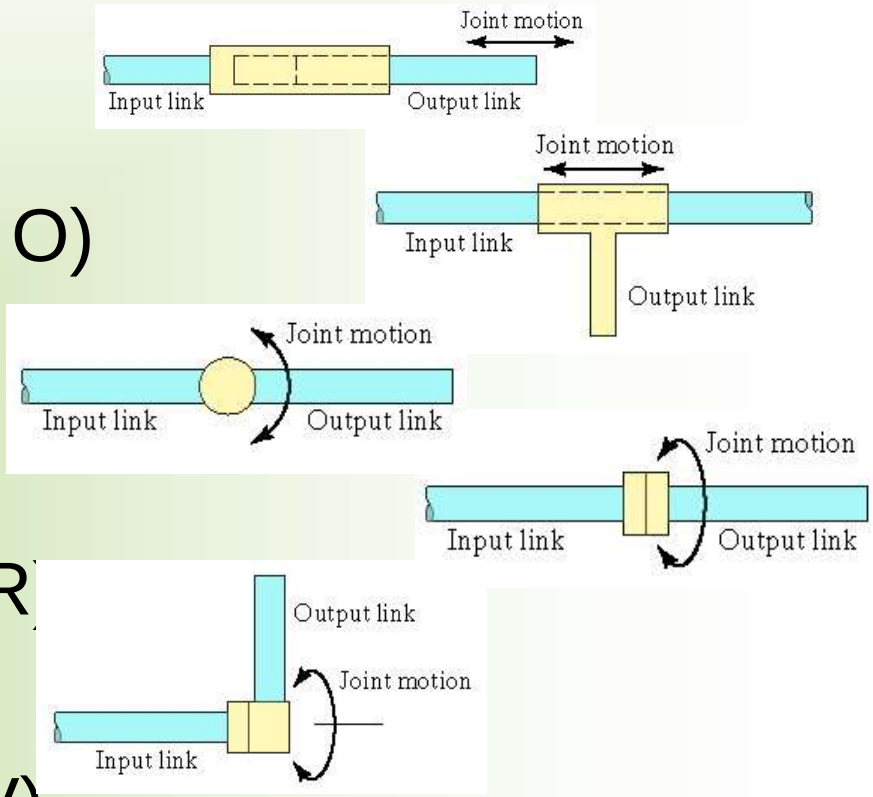
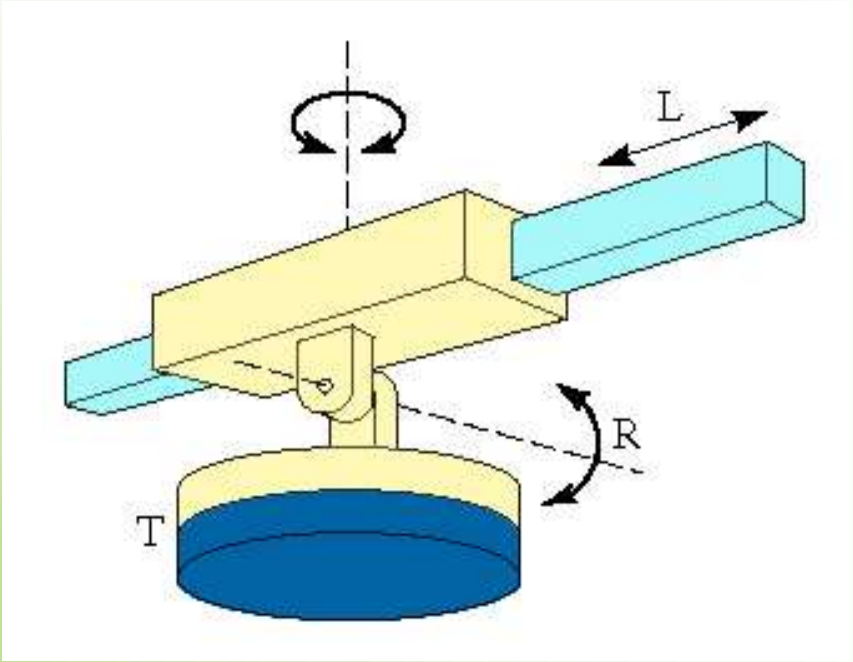
Manipulator Joints

- Translational motion
  - Linear joint (type L)
  - Orthogonal joint (type O)
- Rotary motion
  - Rotational joint (type R)
  - Twisting joint (type T)
  - Revolving joint (type V)



Polar Coordinate Body-and-Arm Assembly

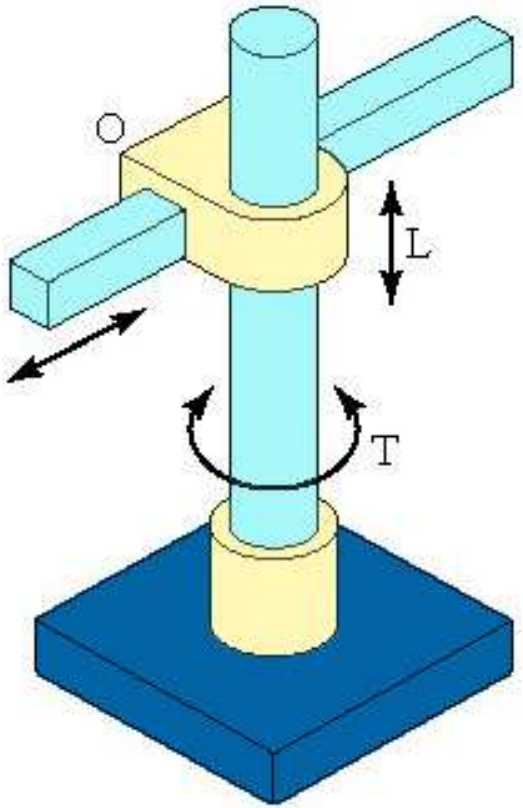
- Notation TRL:



- Consists of a sliding arm (L joint) actuated relative to the body, which can rotate about both a vertical axis (T joint) and horizontal axis (R joint)

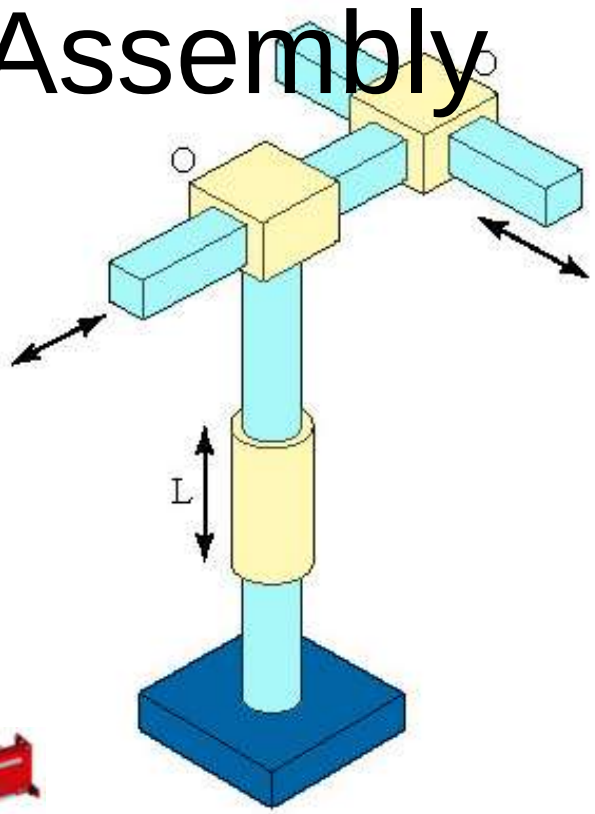
Cylindrical Body-and-Arm Assembly

- Notation TLO:

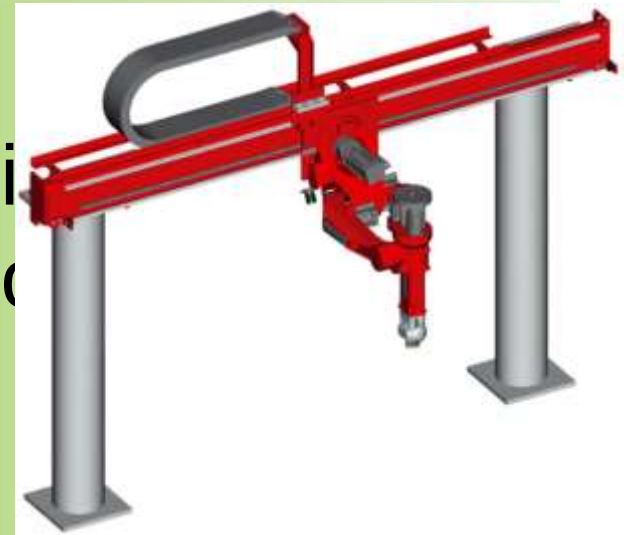


- Consists of a vertical column, relative to which an arm ass is moved up or do
- The arm can be n in or out relative t column

Cartesian Coordinate Body-and-Arm Assembly



- Notation LOO:
- Consists of three sliding joints, two of which are orthogonal
- Other names i
  rectilinear robo
  robot



Jointed-Arm Robot

- Notation TRR: