

EC4.401 Robotics: Dynamics and Control

Assignment 1

Robotics Research Center

International Institute of Information Technology Hyderabad

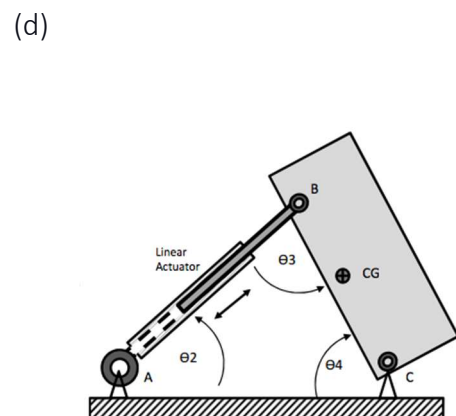
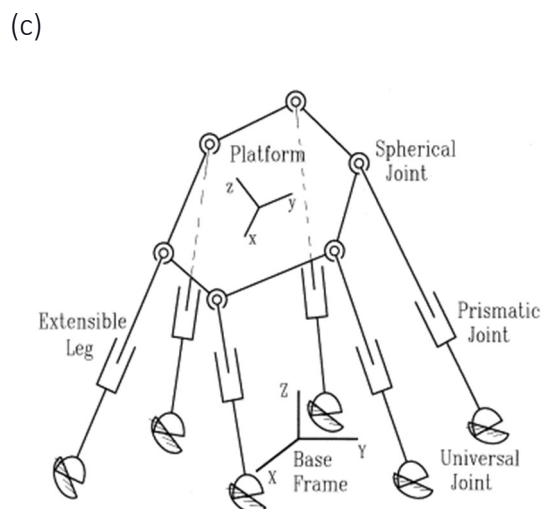
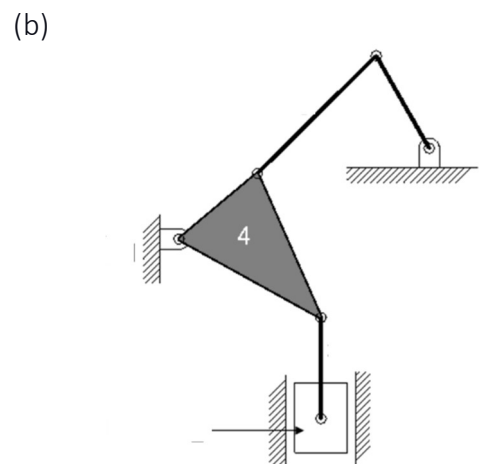
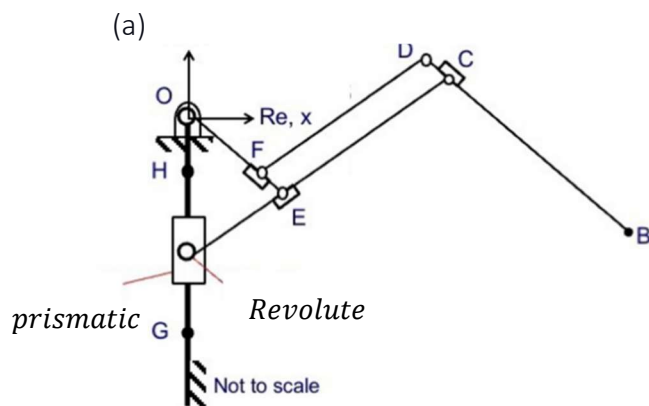
Total Marks : (5)
Due Date : 02-09-2021
Late Submission : Each day after the due date will receive a penalty of 1 mark – deducted from the total marks obtained.

Answer all the questions.

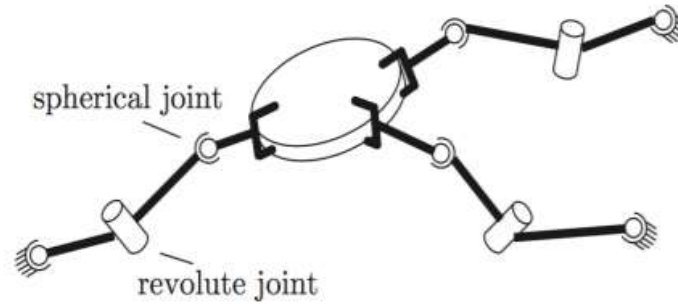
1. Mobility Analysis

1.1 Determine the DoF for the following (2)

1.2 Mention the name or application for at least two mechanisms (Everyone must have encountered these mechanisms in your day-to-day life) (1)



2. Three Spherical – Revolute - Spherical (SRS) identical arms are **grasping** an object, as shown below.



- 2.1 Find the number of DoF of this system. (1)
- 2.2 Suppose there are total of n such arms grasping the object. How many degrees of freedom does this system have? (0.5)
- 2.3 Suppose the spherical **wrist** joint in each of the n arms is now replaced by a universal joint. How many degrees of freedom does this system have? (0.5)