EC4.404 Mechatronics System Design

Assignment 2

Robotics Research Center

International Institute of Information Technology Hyderabad

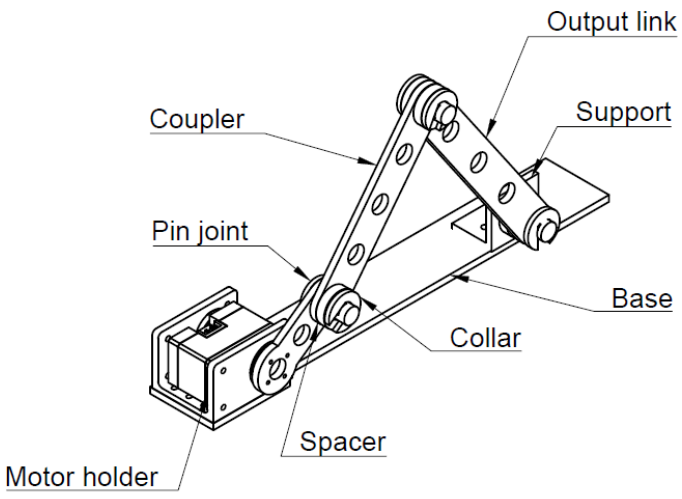
14-02-2022

Total Marks : (100)
Due Date : XX-03-2022
Late Submission : Not allowed
Penalty for plagiarism – zero mark.
All codes must be submitted, and the results must be explained in detail with the help of images or screenshots.
Preferred tool - Matlab

1. Find five mechanisms, take a picture of them, draw the kinematic diagram, and find DoF. (15)

2. Find whether the four-bar mechanism is Grashof or non-Grashof: Write a code to take link lengths as input arguments and output the type of inversion. (10)

3. Number synthesis:
   a. Consider up to 16 links not exceeding the 8^{th} order and find all possible combinations for **one** DOF. (10)
   b. Consider up to 16 links not exceeding the 8^{th} order and find all possible combinations for **two** DOF. What is the minimum number of binary links needed for 2 DoF? (10)
   c. Write a program that takes the following as the input arguments and outputs a table comprising the number of links and link sets. (25)
      Input arguments:
      i. Number of links
      ii. Maximum order of a link
      iii. DoF
4. Design a four-bar mechanism using CAD software and assemble it with no physical collision/interference. Check the manufacturing feasibility – it should be ready to fabricate. Submit a video on Moodle and share the project file. (30)
   Refer to the pdf files (Sheets 1,2 and 3) for all the dimensions.



Complete assembly