Kinematics & Dynamics of Machinery (ME 3320)

Recitation - 4

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1. **Agenda:**
   - GIM Basics
   - GIM

2. **GIM Basics:**
   - **Assume that you are working as a Design Engineer at your dream company, for what kind of problems would you think of building a linkage(or any other components-based) mechanism?**

   - **Why should you learn GIM?**

   - **What modules does GIM provide?**

   - **What can you do within the 'Geometry Module' in GIM?**

   - **What can you do within the 'Motion Module' in GIM?**

- **What is the overall procedure of performing a kinematic simulation in a GIM?**

  Step 1: …………………………

  Step 2: …………………………

  Step 3: …………………………

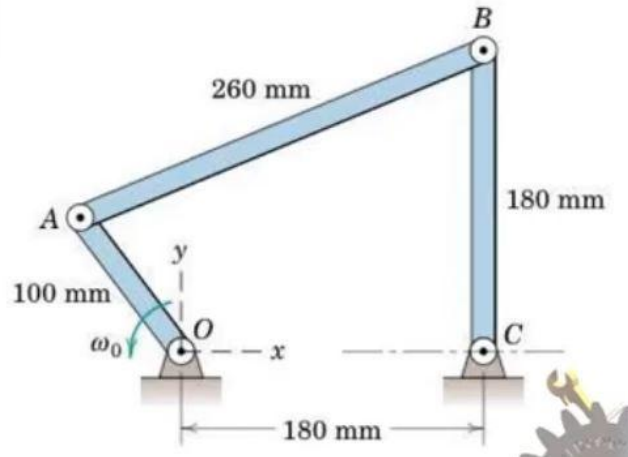 Step 4: …………………………

  Step 5: …………………………

  Step 6: …………………………

3. GIM:

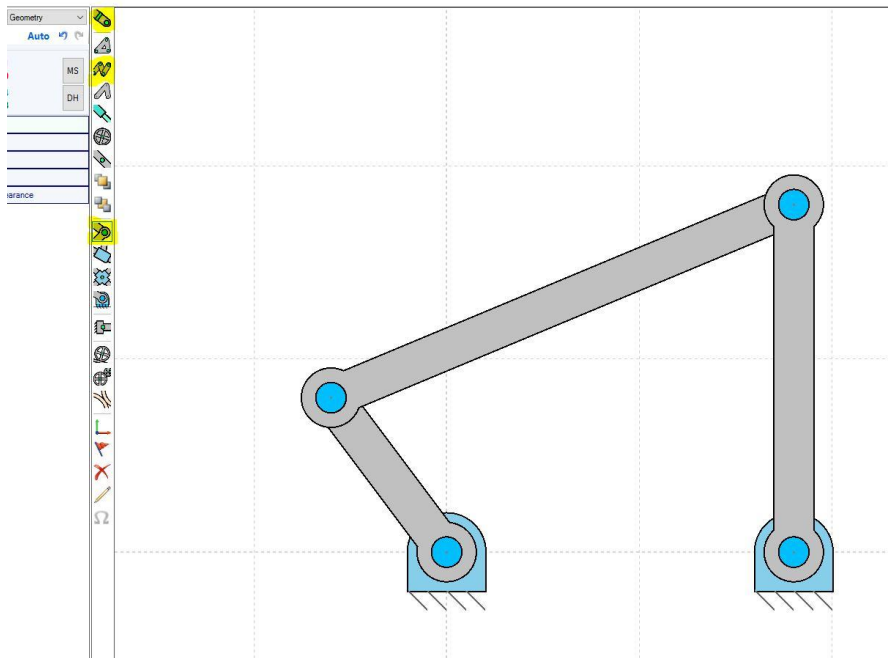### 3.1 4-Bar Mechanism

A diagram of the 4-bar linkage is given below. Assume:

- OA has constant counterclockwise angular velocity w_0 = 10rad/s
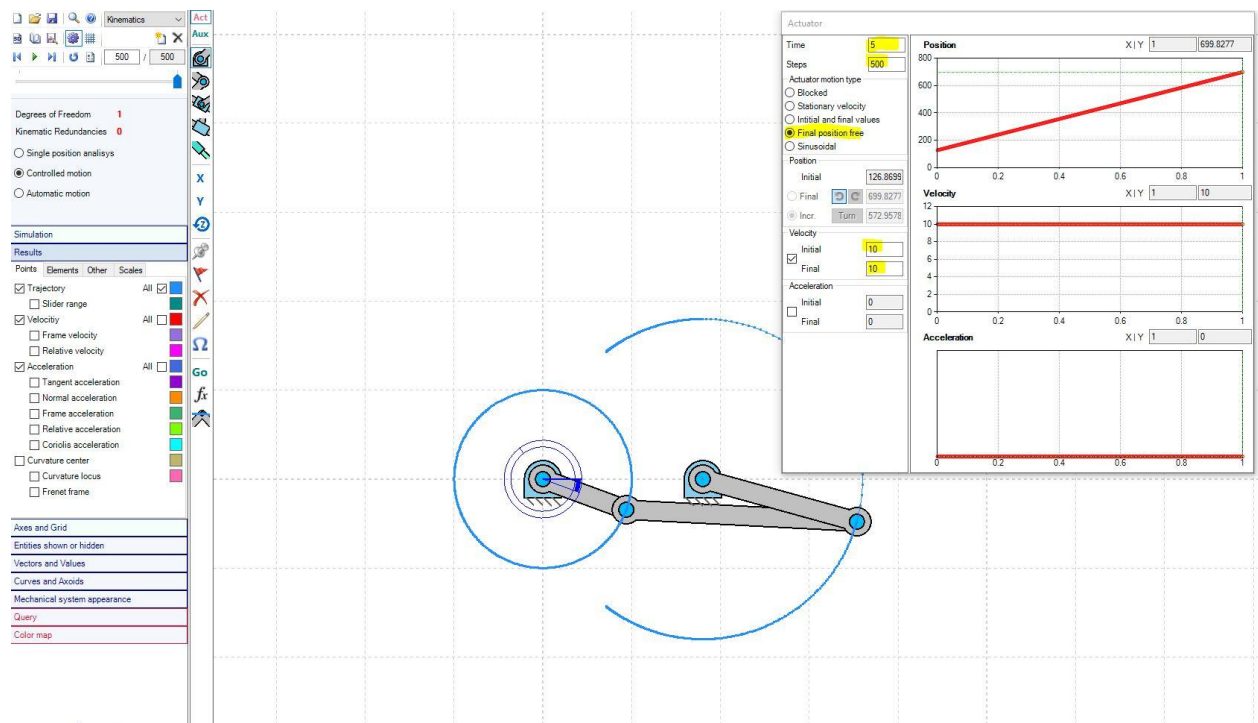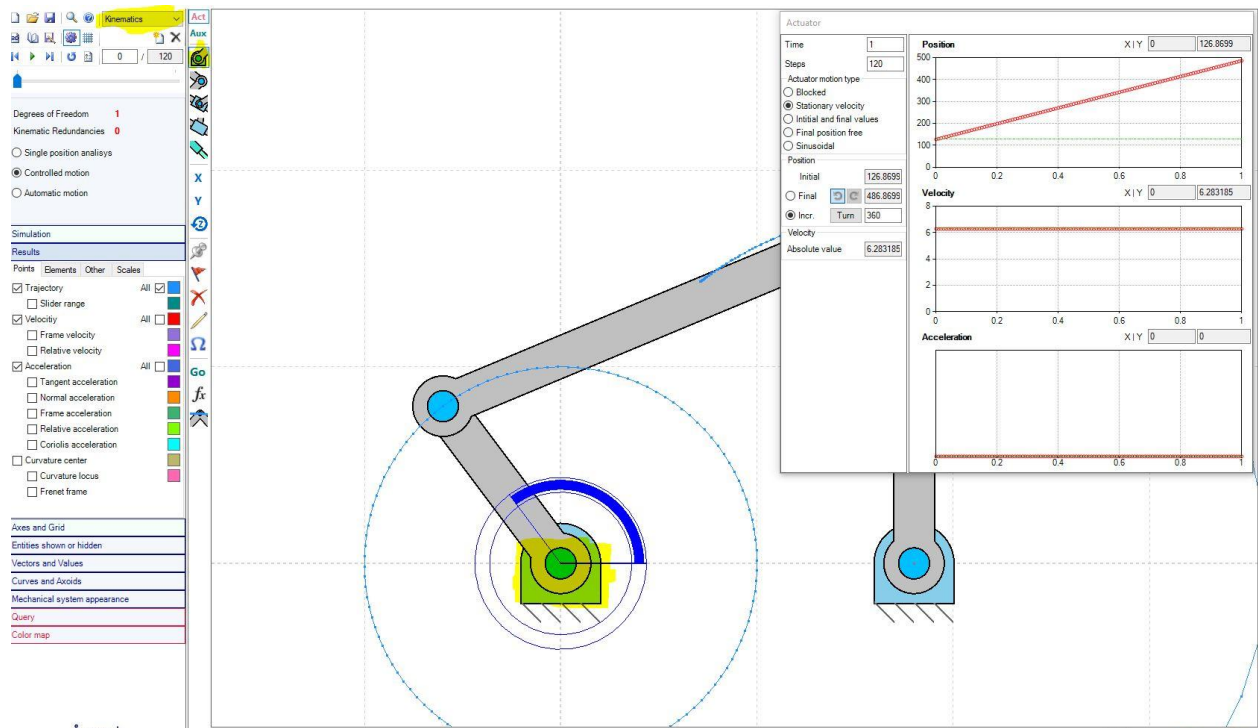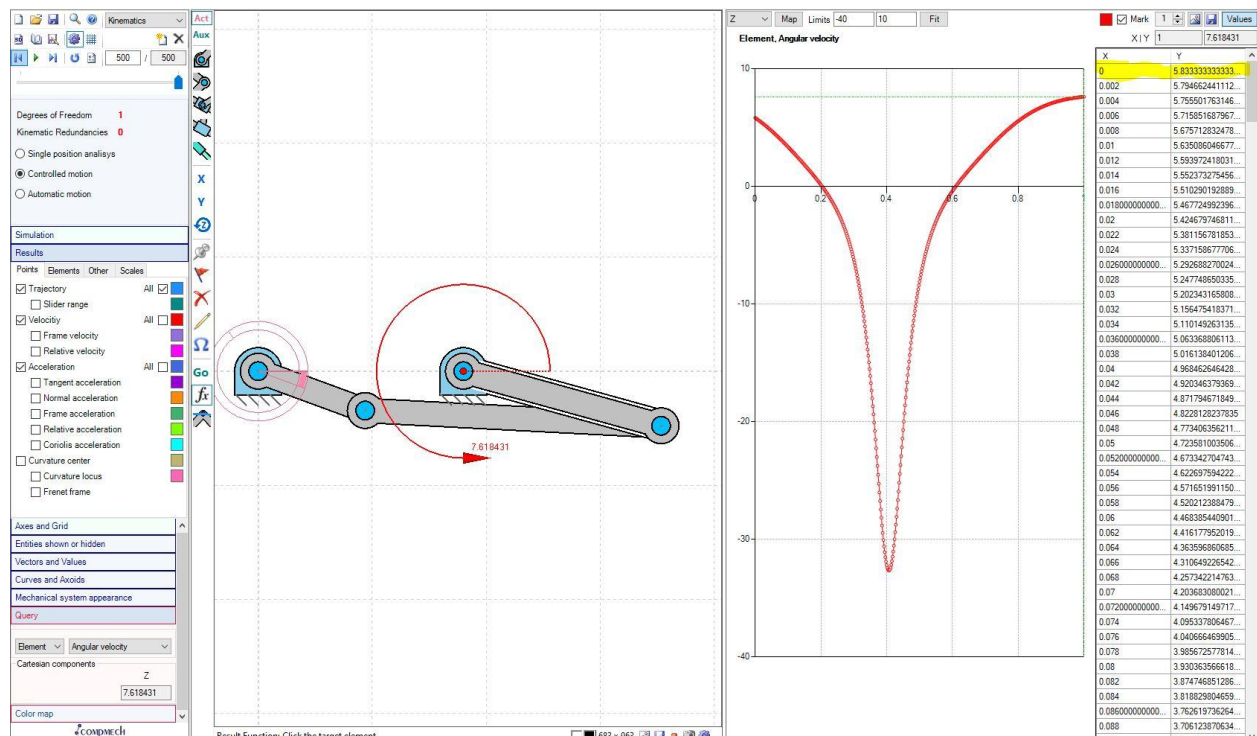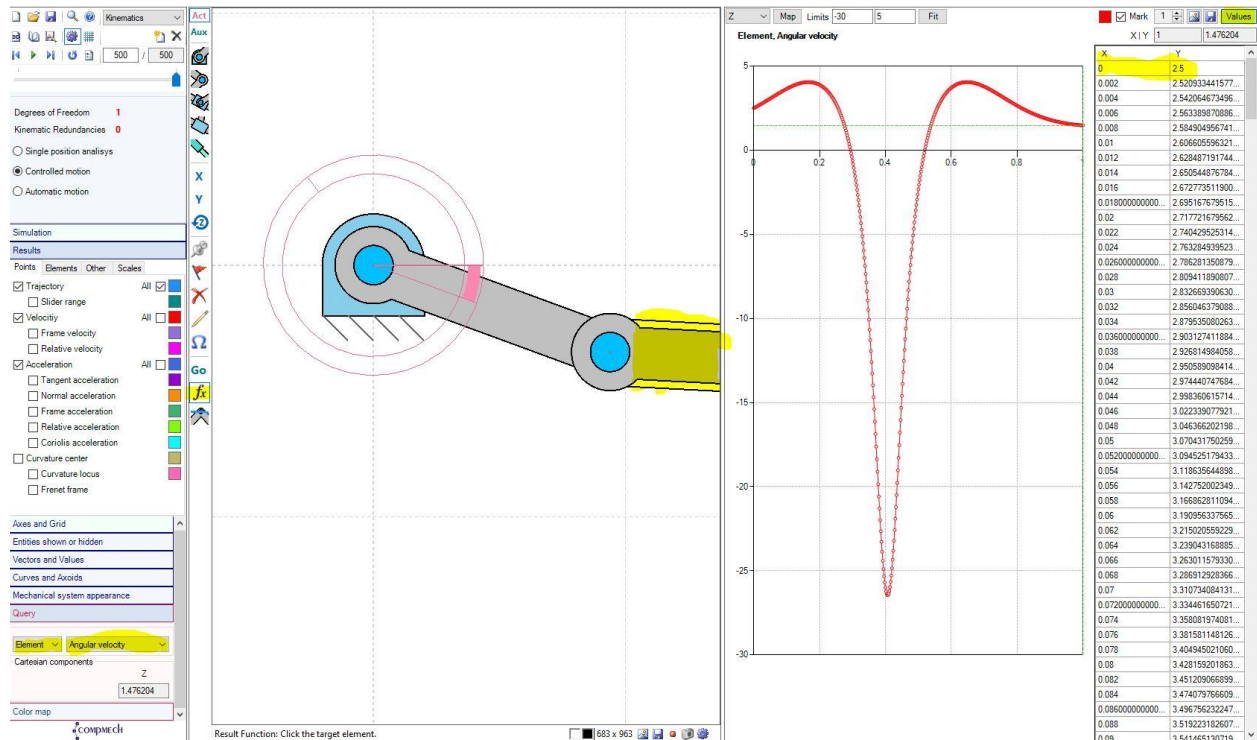- Coordinates of A are x = -60 mm and y = 80 mm

A. Sketch the linkage in the GIM software.

B. Use GIM to:

1. Verify that the initial angular velocities of the links BC and AB are w_{BC} = 5.83 rad/s & w_{AB} = 2.5 rad/s
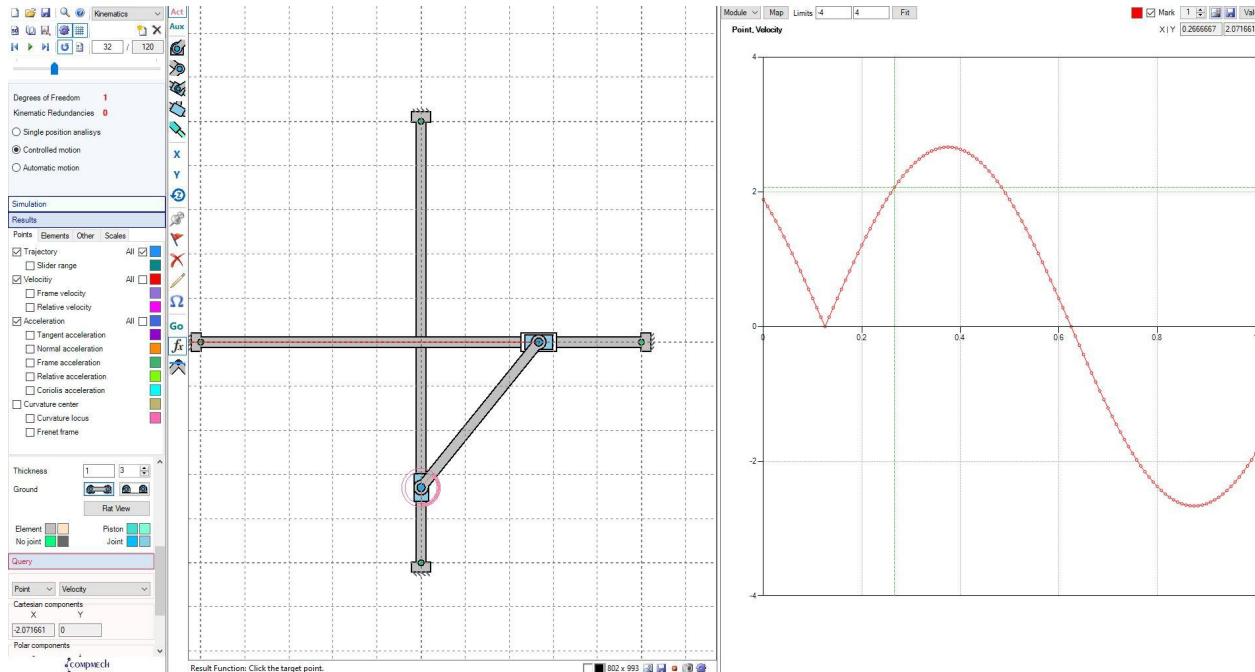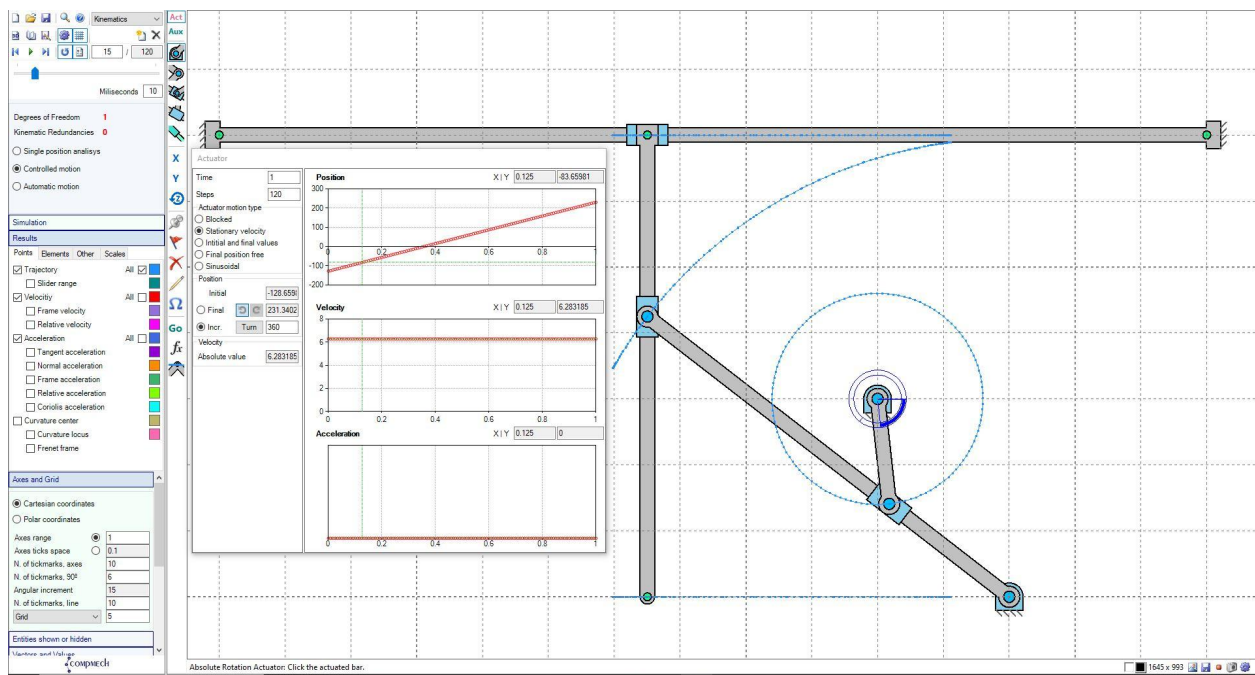
2. Find the initial angular acceleration of the link AB

(Now, let's design some mechanisms and explore the simulation using the default values used in the GIM program)
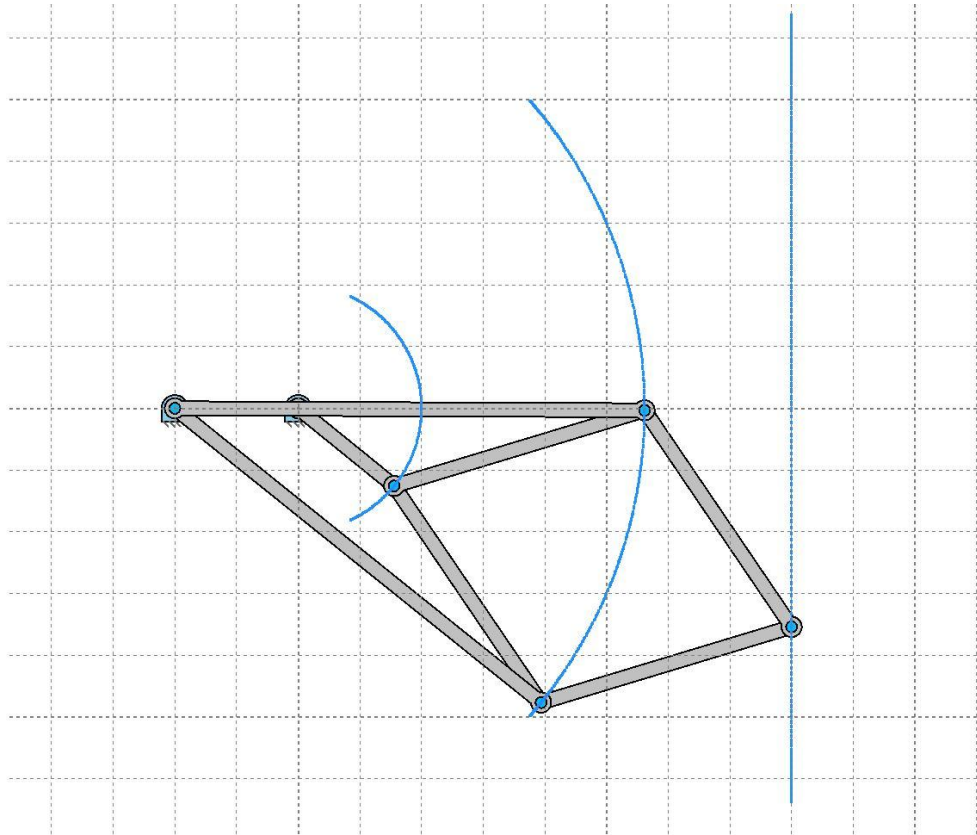
3.2 PRRP Mechanism

3.3 Scotch Yoke Mechanism

3.4 Peaucelier Mechanism
(Using GIM Library: Computed-> Kinematics->)

Bibliography:

- Petuya, V.; Macho, E.; Altuzarra, O.; Pinto, C. and Hernández, A. "Educational Software Tools for the Kinematic Analysis of Mechanisms". Comp. Appl. Eng. Education. First published online: February 24, 2011. DOI: 10.1002 cae.20532. ISSN: 1061-3773.
- https://www.youtube.com/watch?v=wppPMd3oxZo
- https://www.youtube.com/watch?v=n6LgMY2iCjM
- https://www.youtube.com/watch?v=JyaYKiuxGNs

Miscellaneous:

- **In the GIM Library, try: Computed-> Cycloidal**