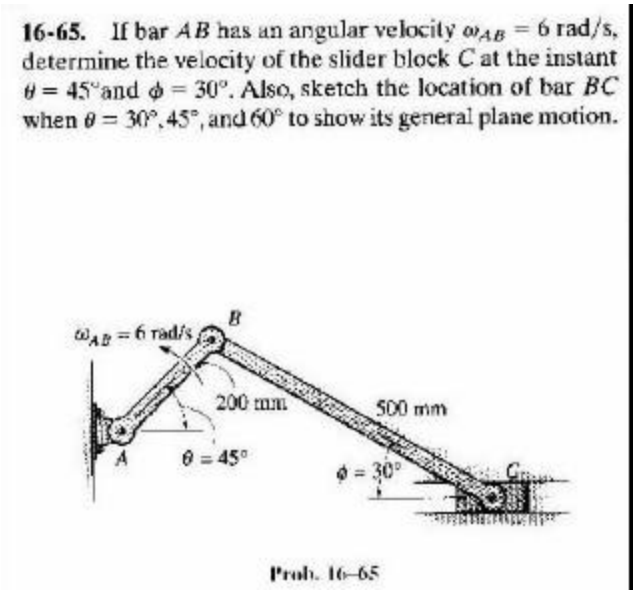
24-351

Fall 2000

Homework 3: Adams Assignment

In this assignment, you are going to solve problem 16.65 of Hibbeler, eighth edition. The problem is shown below.



Starting ADAMS.

1. From the ADAMS product menu, select **ADAMS**.

   The Run ADAMS dialog box appears.

2. Select **OK**.

   The Welcome to ADAMS dialog box appears as shown in Figure 1.

3. Under the heading "How would you like to proceed", select **Create a new model**.

   Verify the Gravity text field is set to **Earth Normal (-Global Y)**.
   Verify that the Units text field is set to **MMKS - mm,kg,N,s,deg**.
   Select **OK**.

Making the crank;

1. Select the **Rigid Body: Link** tool.  with the left mouse button from the main toolbox.
2. In the link container at the bottom of the Toolbox, activate the Length toggle switch and enter **200mm** in the text field below.
3. Click somewhere on the screen to display the bar.
4. Click on the bar with the right mouse button. Follow the pull-right menu for **Part:PART_1** and select **Modify**.

   The Modify Rigid Body dialog box appears.

   Select the **Change Position** Icon  from the left lower corner of the dialog box.

   The Move Selected Objects dialog box appears.

   Select the **Repositioning Objects Relative to the Working Grid by Entering Coordinates** Icon 

   Enter **(45,0,0)** in the **Orientation** text field , select **Set** and close the dialog box.

   Click **OK** on the Modify Rigid Body dialog box.

Making the link & slider block;

5. Select the **Rigid Body: Link** tool.  with the left mouse button from the main toolbox.
6. In the link container at the bottom of the Toolbox, activate the Length toggle switch and enter **500mm** in the text field below.
7. Click on the right most marker of the crank, create the link.
8. Click on the bar with the right mouse button. Follow the pull-right menu for **Part:PART_2** and select **Modify**.

   The Modify Rigid Body dialog box appears.

   Select the **Change Position** Icon  from the left lower corner of the dialog box.

   The Move Selected Objects dialog box appears.

Select the **Repositioning Objects Relative to the Working Grid by Entering Coordinates** Icon 

Enter **(330,0,0)** in the **Orientation** text field, select **Set** and close the dialog box.

Click **OK** on the Modify Rigid Body dialog box.

9. Use the **Rigid Body: Box** tool  from the parts button stack to add a mass at the end of the link.

Creating joints;

1. Click on the **Joint** icon in the Main Toolbox and select the **Joint:Revolute** icon  from the joints button stack.
2. Verify that the **Construction** text field reads **1 Location** and **Normal to Grid**.
3. Position the cursor over the marker **MAR_1** at the left end of the crank and click once with the left mouse button.
4. A joint between the crank and the ground is created at that location.
5. Click on the **Joint** icon in the Main Toolbox and select the **Joint:Revolute** icon  from the joints button stack.
6. Verify that the **Construction** text field reads **2 Body 1 Location** and **Normal to Grid**.
7. Click on the crank and the link and move the cursor over the marker between them, click with left mouse button to create a joint between the crank and the link.
8. Click on the **Joint** icon in the Main Toolbox and select the **Joint:Revolute** icon  from the joints button stack.
9. Verify that the **Construction** text field reads **2 Body 1 Location** and **Normal to Grid**.
10. Click on the link and the slider block, move the cursor over the marker between them, click with left mouse button to create a joint between the link and the slider block.
11. Click on the **Joint** icon in the Main Toolbox and select the **Joint:Translational** icon  from the joints button stack.
12. Click on the slider block, move the cursor upalong the X axis away from the origin until an arrow pointing straight up appears.
    Make sure the arrow is parallel to the X axis.

Setting initial motion.

1. Click and hold the bar with the right mouse button and follow the pull right menu for **the joint between the crank and the ground**, select **Modify**.
2. Click on the **Impose Motions** button.
3. Change the displacement function to 6.0 * time.

After verifying the model, compute 10 seconds of simulation and plot theta vs. time, phi vs. time, and the velocity of C vs. time.

Good luck!