Pro/Mechanism Design

Mechanism design is used to define a mechanism, make it move, and analyze its motion.

1. Starting Mechanism design:
   a) Start Pro/E and open tutorial2b.asm
   b) Click **Applications > Mechanism.** Mechanism Design begins.

2. Creating a Servo Motor:
   a) Click **Mechanism > Servo Motors**. The **Servo Motors** dialog box opens as shown in figure 1.

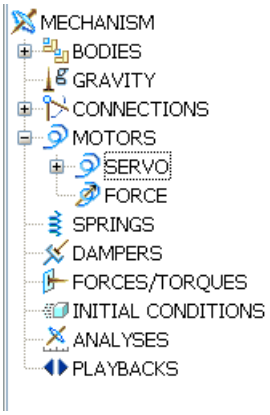


Figure 1

   b) Click **New**. The **Servo Motor Definition** dialog box opens as shown in figure 2.

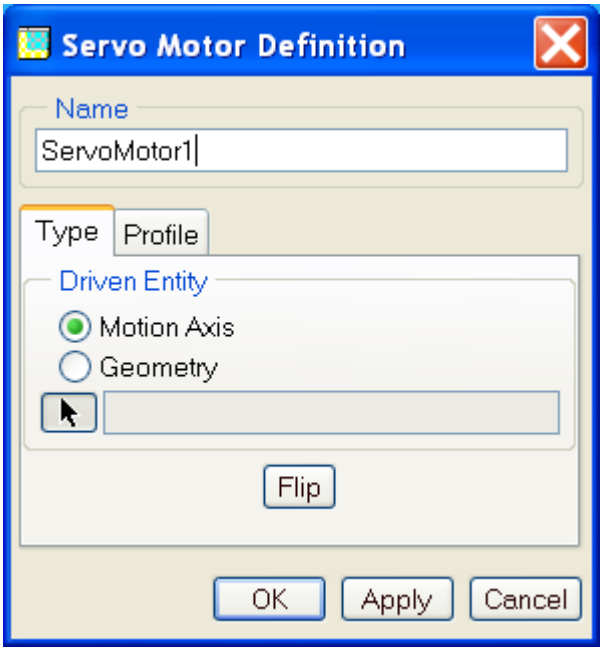


Figure 2

c) On the **Type** tab, for the **Driven Entity**, select **Motion Axis**, and choose the pin joint connecting part1.prt to part2.prt (connection_2_axis_1) as shown in figure 3a.

d) On the **Profile** tab, change the **Specification** to **Velocity** as shown in figure 3b.

e) The **Magnitude** should be **Constant**. Enter the value **72** for A as shown in figure 3b.

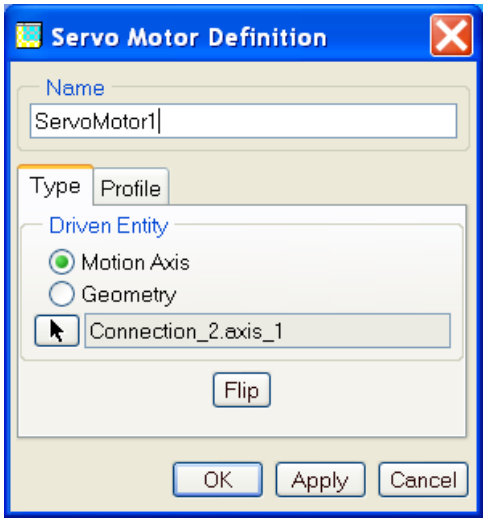


Figure 3a

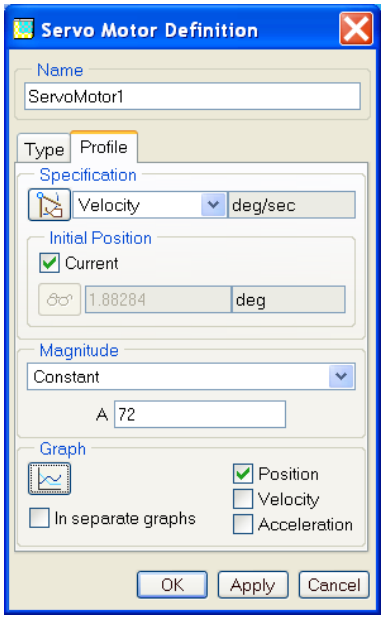


Figure 3b

f) Select the **Position** check box and click  . The plot shows that the servo motor will go through two full rotations in 10 seconds as shown in figure 4.

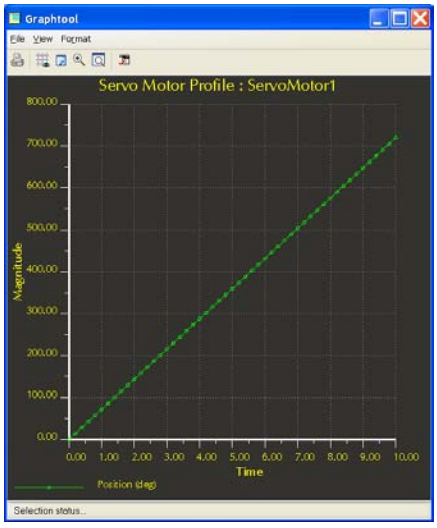


Figure 4

g) Click OK.

3. Creating and Running a Kinematic Analysis

a) Select **Analysis > Mechanism Analysis** or click  . The **Analysis Definition** dialog box opens as shown in figure 5a.

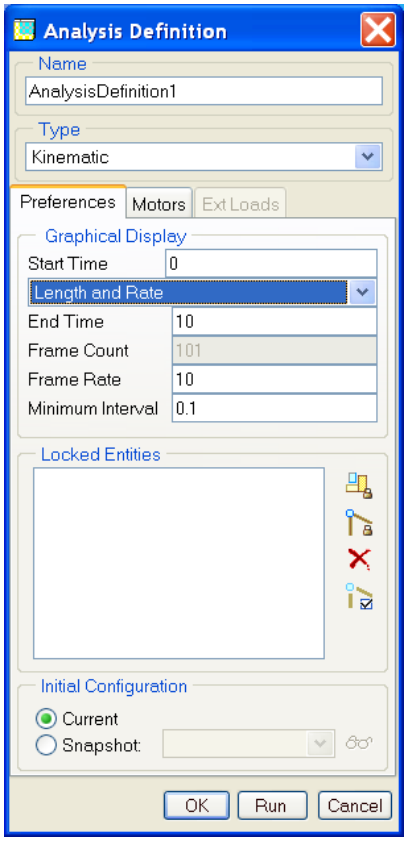


Figure 5a

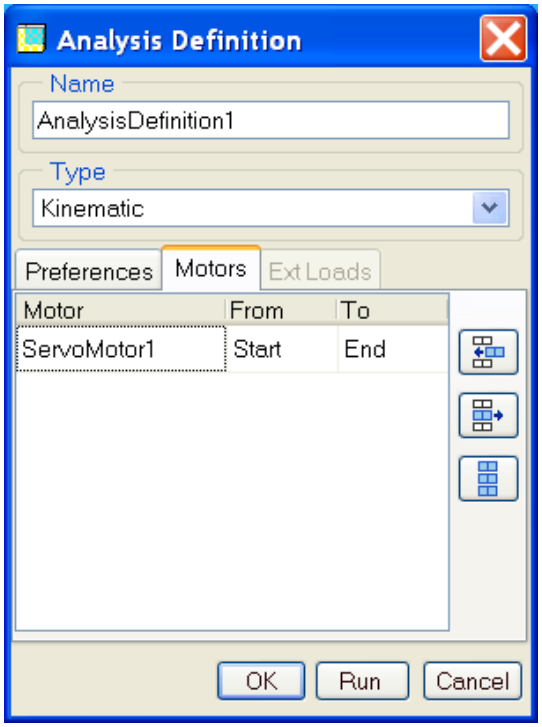


Figure 5b

b) Under **Type**, select **Kinematic**. Accept the default name, AnalysisDefinition1.

c) On the **Preferences** tab, accept the default values.

d) On the **Motors** tab, be sure ServoMotor1 is listed. If it is not, click  as shown in figure 5b.

e) Click **Run**. The progress of the analysis is shown at the bottom of the model window, and the model moves through the specified motion.

To view the analysis results in later sessions of Mechanism design, you must save them as a playback file.

4. Saving and Reviewing Results

a) Replay results. Select **Analysis > Playback or click**  . The **Playbacks** dialog box opens as shown in figure 6a, click  . The **Animate** dialog box opens as shown in figure 6b.

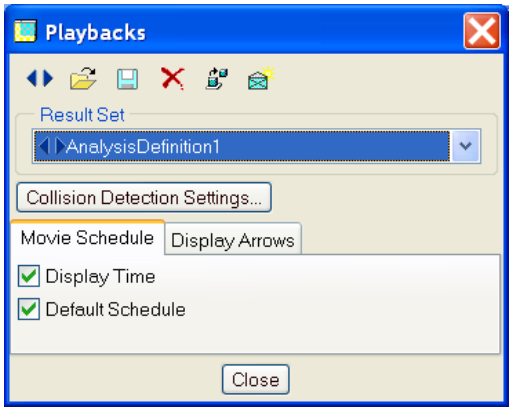


Figure 6a

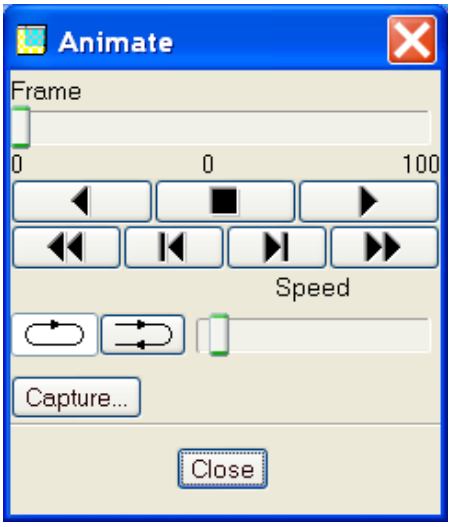


Figure 6b

b) Click  to play or click Capture to save animation file as shown in figure 7.

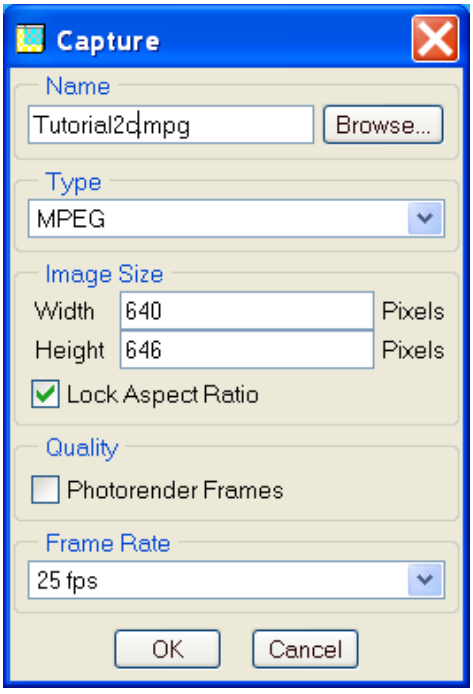


Figure 7

c) On the **Playbacks** dialog box, click  to save your results as a .pbk file. In the **Save** dialog box, accept the default name or change to another name. The default directory is the current working directory. You can also browse to find another directory to save your file. You can open the .pbk file in future sessions by clicking  and selecting the playback file. Click **Close** to quit.

d) Select **Analysis > Measures** or click  . **The Measure Results** dialog box opens as shown in figure 8.

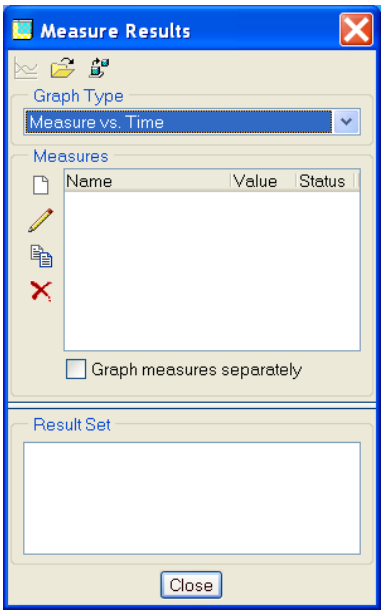


Figure 8

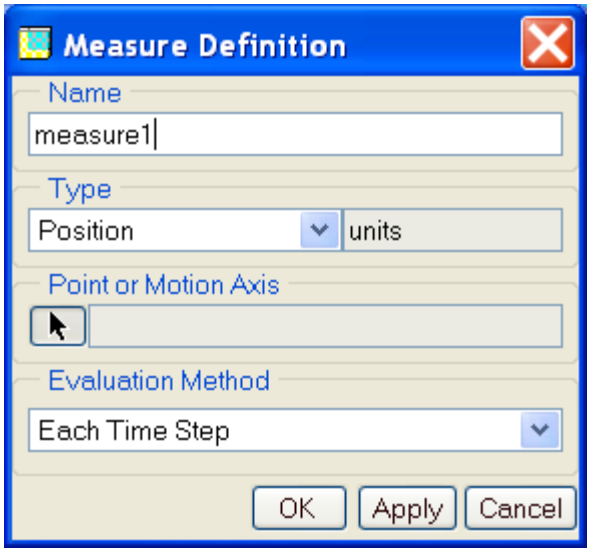


Figure 9

e) Click  . The **Measure Definition** dialog box opens as shown in figure 9. Accept measure1 as the name.

f) Under **Type**, select **Position**.

g) Select a vertex on the part2 as shown in figure 10.

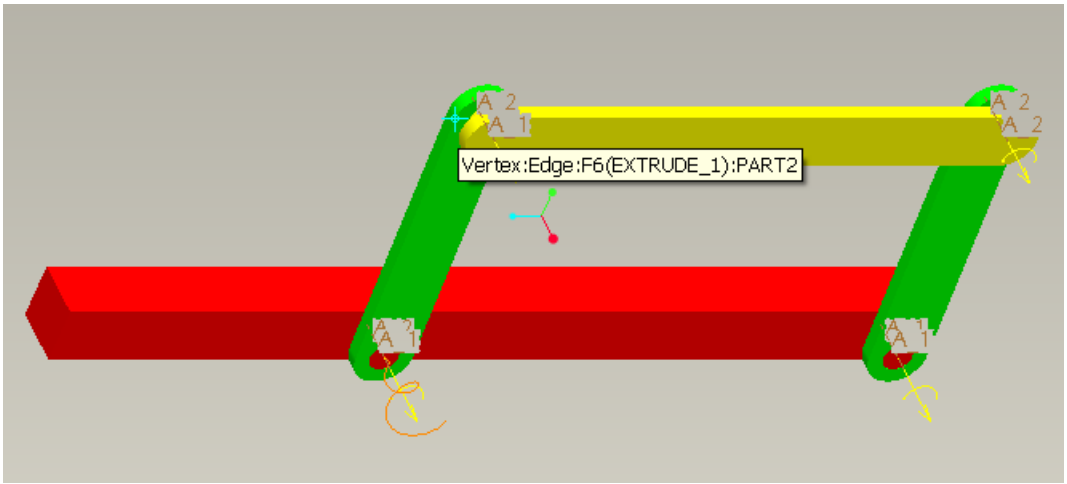


Figure 10

h) Select **Y-component** in the **Component** area, and accept the WCS for the **Coordinate System**. Under **Evaluation Method**, accept **Each Time Step** as shown in Figure 11.

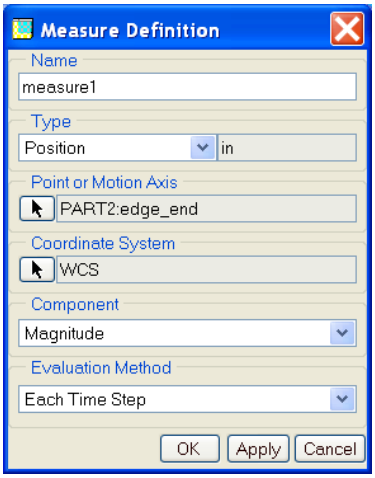
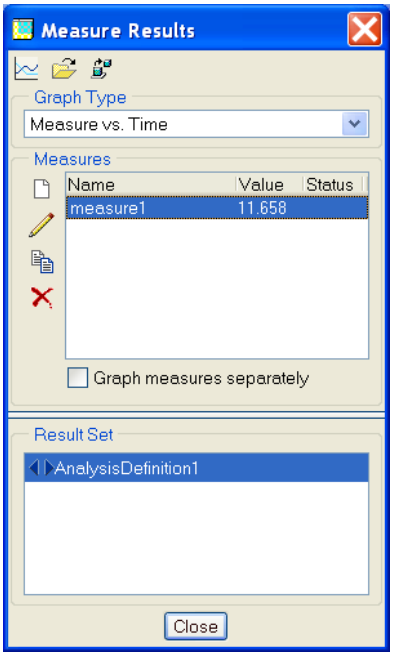


Figure 11

i) Click **OK**.

j) On the **Measure Results** dialog box as shown in figure 12, select measure1 under **Measures**, and AnalysisDefinition1 under **Result Set**. (If you changed the result set name, select the appropriate name.) The **Graph Type** should be **Measure vs. Time**.



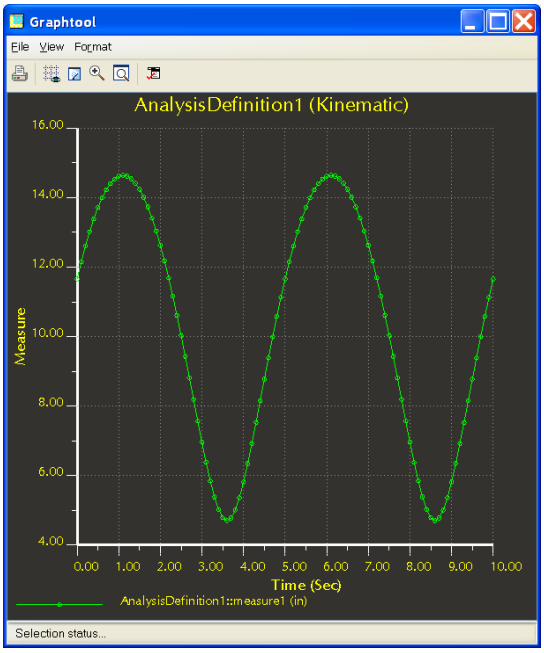


Figure 12 Figure 13

k) Click  to see the plot of the measure. The plot should be a cosine curve as shown in figure 13.

l) Click to view animated simulation Tutorial2c.mpg