

Homework #5

Due Monday 8 October 2001

Reading and problems are taken from R.C. Hibbeler, *Engineering Mechanics Dynamics*, Ninth Edition, Prentice-Hall, 2001.

Reading: Chapter 15.1-15.3, 15-5-15.7

Problems:

1. (10 points) 15-34
2. (10 points) 15-47
3. (10 points) 15-50
4. (10 points) R1-45 (on p. 287 of the text)
5. (10 points) 15-109
6. (10 points) 15-110

Adams Problem

(20 points) This is a hands-on problem. Below are several pictures of the window opening mechanism from the transom windows in the lecture room (HH B103). Assume that the control rod is pulled downward at a speed of 2 in/sec.

- (a) Your assignment is to compute the angular velocity and angular acceleration of the window at the instant the window is 45 degrees from vertical (Fig. 2).
- (b) Create an Adams Simulation of the window over the approximate range of motion of the window. Submit plots of the window's angular velocity and acceleration. Comment on the results. Do the plots agree with your calculations from part (a)? Also submit an isometric view of your Adams model.

You can take measurements directly from the window mechanism, or you can estimate them from Fig. 3, which shows a scale (inches). In your solution, include a sketch of the mechanism showing the dimensions you used.

Do not attempt to open the window. The window is stuck. Opening it would require excessive force, which could cause the window to break, resulting in possible injury to you or others.



Fig. 1 Mechanism in the closed position.



Fig. 2. Window opened approximately 45°.



Fig. 3. A scale in inches for estimating dimensions.



Fig. 4. Another view of the open window.