

ENGR 222 Dynamics
Problem Set #6

Meriam and Kraige, Engineering Mechanics-Dynamics (Eighth Edition)

Material Covered: Chapter 8-1 to 8-3

Topics Covered:

Simple harmonic oscillator
phase space
two dimensions

Resonance
Damping
Driven

1. Meriam and Kraige (8th ed.), problem 8/5.
2. Meriam and Kraige (8th ed.), problem 8/44.
3. Meriam and Kraige (8th ed.), problem 8/57.
4. Meriam and Kraige (8th ed.), problem 8/69.
5. Fowles and Cassiday 3.19+

Consider a simple pendulum of length ℓ which swings freely.

- a. Show that the pendulum will undergo simple harmonic motion for small oscillations.
- b. What is the period for small oscillations?
- c. If the pendulum is used as a laboratory experiment to determine the value of g , find the error introduced by using the small-angle approximation formula if the maximum amplitude of oscillation is 45° .
- d. Make a phase space plot for the pendulum.