

Problem 25

Suppose that the system of Problem 24 is modified to include a damping term and that the resulting initial value problem is

$$u'' + \frac{1}{5}u' + u + \frac{1}{5}u^3 = \cos \omega t, \quad u(0) = 0, \quad u'(0) = 0.$$

- (a) Plot a computer-generated solution of the given problem for several values of ω between $1/2$ and 2 , and estimate the amplitude R of the steady response in each case.
- (b) Using the data from part (a), plot the graph of R versus ω . For what frequency ω is the amplitude greatest?
- (c) Compare the results of parts (a) and (b) with the corresponding results for the linear spring.