

Problem 22

Problems 21 through 23 deal with the initial value problem

$$u'' + 0.125u' + 4u = F(t), \quad u(0) = 2, \quad u'(0) = 0.$$

In each of these problems:

- (a) Plot the given forcing function $F(t)$ versus t , and also plot the solution $u(t)$ versus t on the same set of axes. Use a t interval that is long enough so the initial transients are substantially eliminated. Observe the relation between the amplitude and phase of the forcing term and the amplitude and phase of the response. Note that $\omega_0 = \sqrt{k/m} = 2$.
- (b) Draw the phase plot of the solution; that is, plot u' versus u .

$$F(t) = 3 \cos 2t$$