

1. F&C 3.19 (a) and (b)
2. Computer Exercise: Use your 4th order Runge Kutta code to numerically find the period for 3.19 for length $l = 1\text{m}$ and $g = 9.80\text{ m/s}^2$. You will need to appropriately modify the force part of the acceleration calculation. (In your data file, note that you need to figure out how k and m would translate to g and l in this problem.) Set the damping term to zero.
 - (a) by using a graph of $x(t)$ find the period.
 - (b) Make a modified phase space plot [$v(x)$] for the case of zero damping and for underdamping both on the same graph. Describe your observations.
3. Computer Exercise: Forced Oscillations
Make 3 graphs of $x(t)$ for the different cases of
 - (1) Underdamped
 - (2) Critically Damped
 - (3) OverdampedWhere for each case you have 5 curves corresponding to different values of the driving frequency ω : $\omega \ll \omega_0$, $\omega = \omega_r$, $\omega = \omega_0$, $\omega = \omega_d$, $\omega \gg \omega_d$. Choose an $x(0)$ and $v(0)$ that you think might be interesting other than either one being zero, and then keep that same initial condition for all cases above. You may need to try a few different maximum times in order to get to steady state. Describe your observations. Can you see transients?
4. F&C 3.18