

PHYS 320 ANALYTICAL MECHANICS

Dr. Gregory W. Clark
Fall 2018.

The Simple Harmonic Oscillator

- Differential equation:

$$m \frac{d^2 x}{dt^2} + kx = 0 \qquad \omega_o \equiv \sqrt{\frac{k}{m}} = \text{natural frequency}$$

- Solutions:

$$x(t) = C_1 e^{+i\omega_o t} + C_2 e^{-i\omega_o t} = B_1 \cos(\omega_o t) + B_2 \sin(\omega_o t) = A \cos(\omega_o t - \delta)$$