MIT MATHLETS

AMPLITUDE AND PHASE: FIRST ORDER

The tide in a harbor lags behind that of the open ocean, and is controlled by a first order linear equation. Bode and Nyquist plots illustrate the steady state and method of solution.
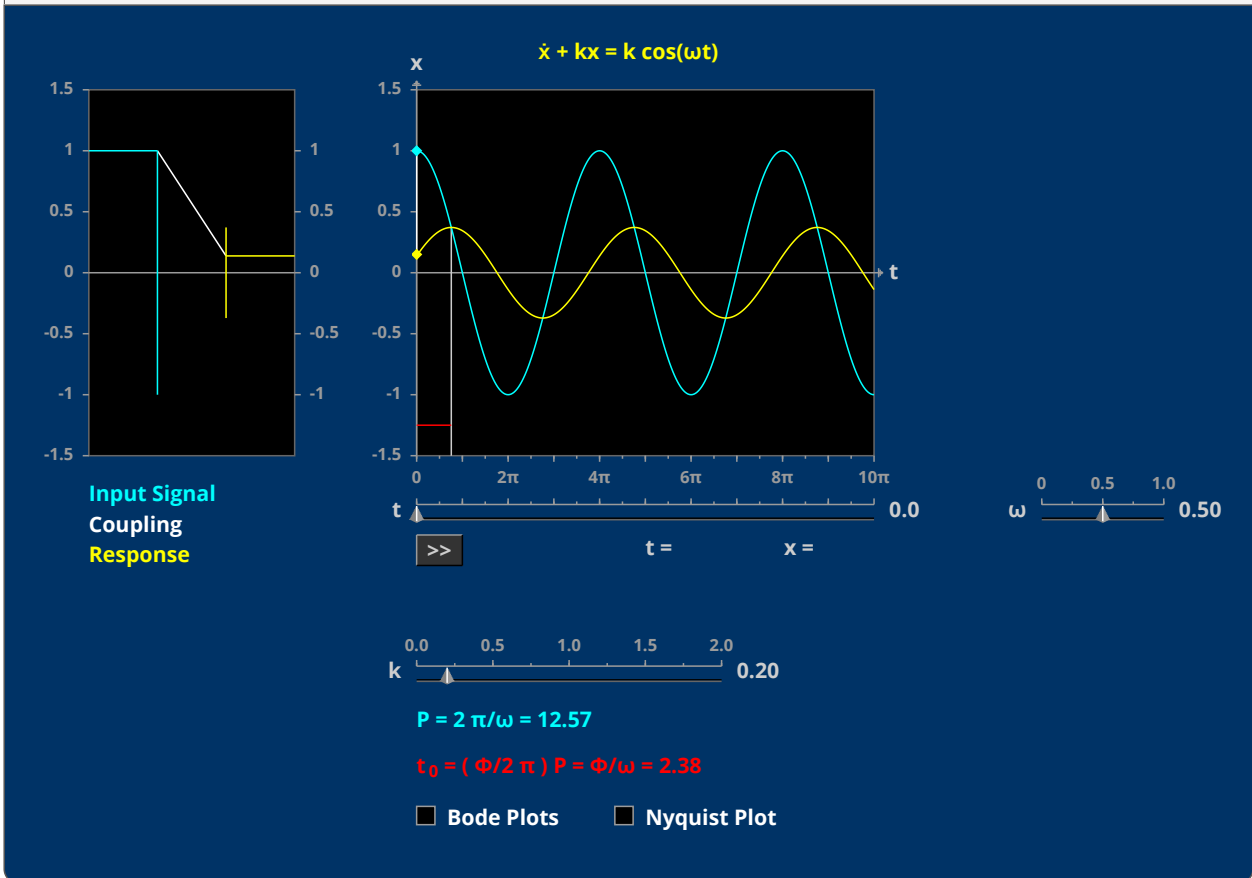
| Mathlet | Description | Theory | Activity | Demo | Comments |

AMPLITUDE AND PHASE: FIRST ORDER   mode   + help

$$\dot{x} + kx = k\cos(\omega t)$$

x

Input Signal
Coupling
Response

t ◢   0.0   ω |—————▲———| 0.50
                                                              0   0.5   1.0

[>>]   t =   x =

                    0.0   0.5   1.0   1.5   2.0
            k |————▲————————————| 0.20

P = 2 π/ω = 12.57

t₀ = (Φ/2 π) P = Φ/ω = 2.38

$$P = 2\pi/\omega = 12.57$$

$$t_0 = (\Phi/2\pi)\,P = \Phi/\omega = 2.38$$

☐ **Bode Plots**   ☐ **Nyquist Plot**