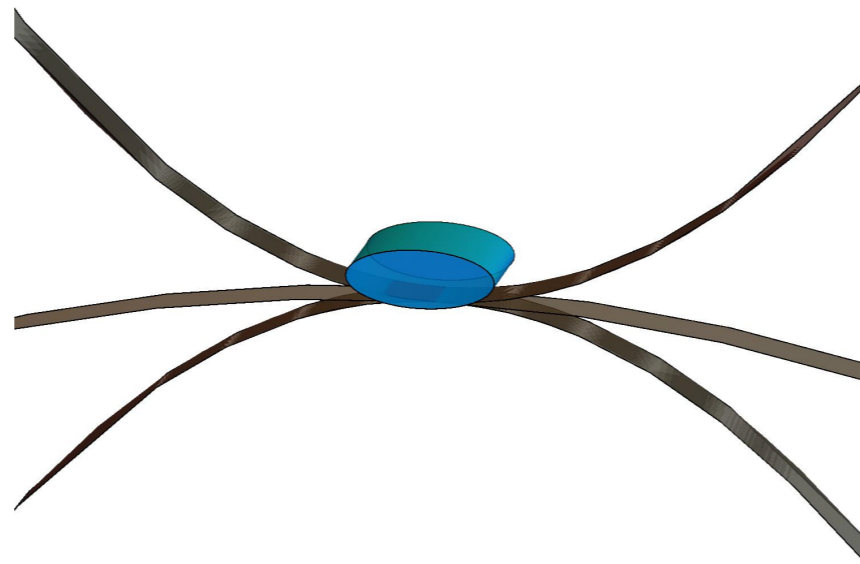**IVP:**

$$m\ddot{x} + k(t)x(t) = 0$$

$$k(t + T) = k(t)$$
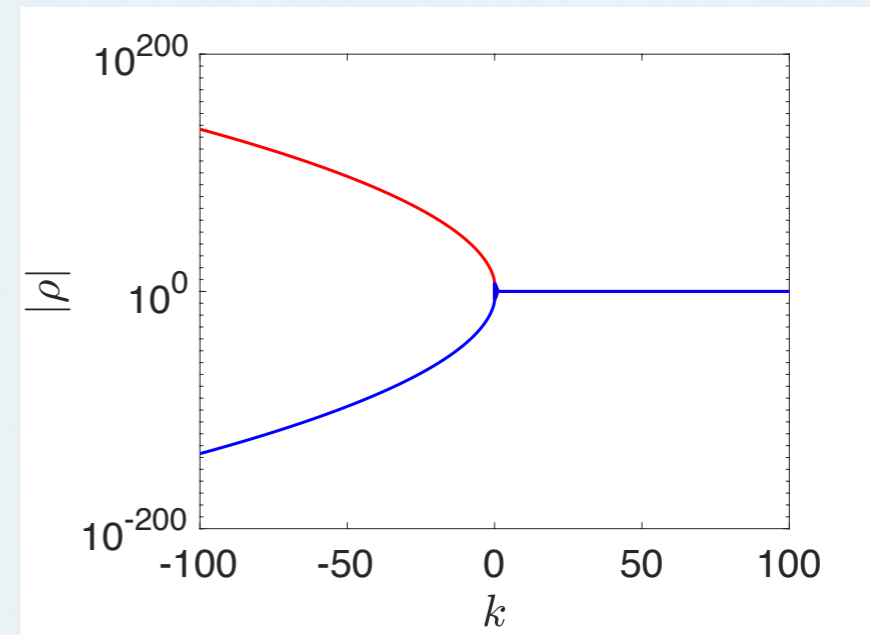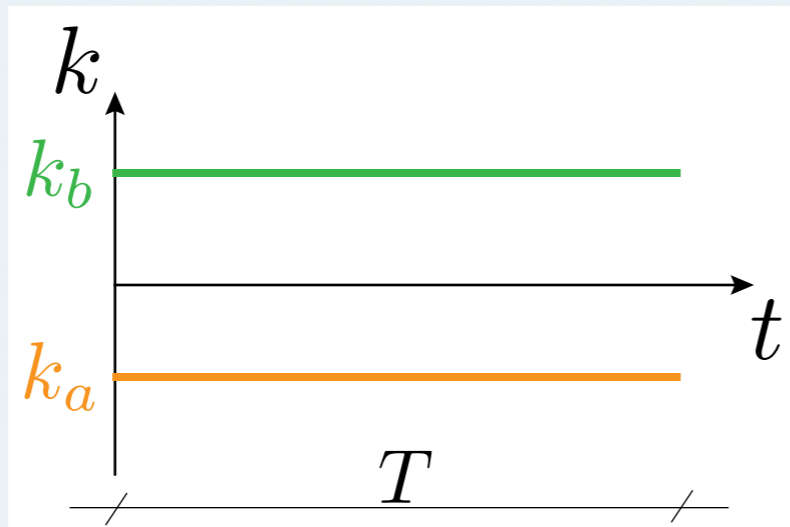
Stability:

$$\begin{bmatrix} \dot{x}(T) \\ x(T) \end{bmatrix} = \mathbf{\Phi} \begin{bmatrix} \dot{x}(0) \\ x(0) \end{bmatrix}$$
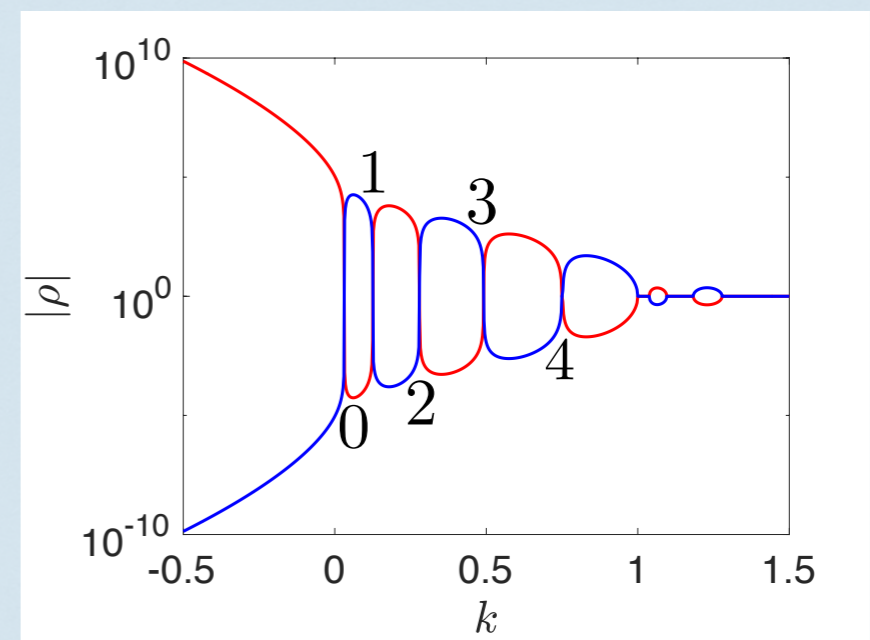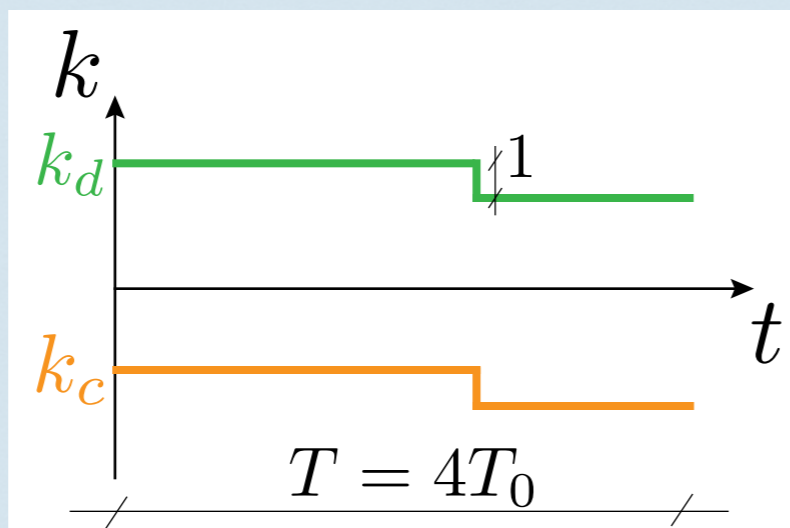
$$\rho = eig(\mathbf{\Phi})$$
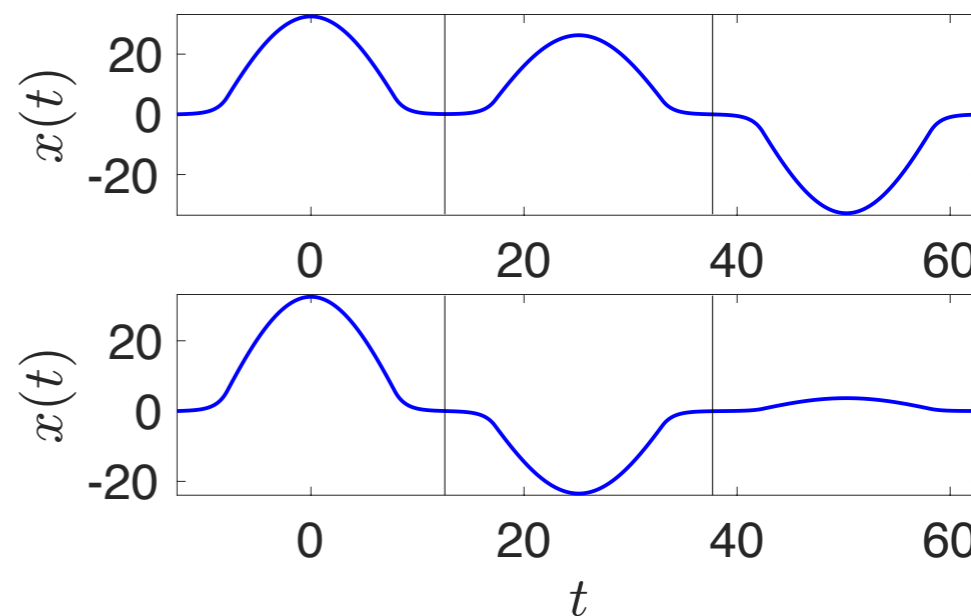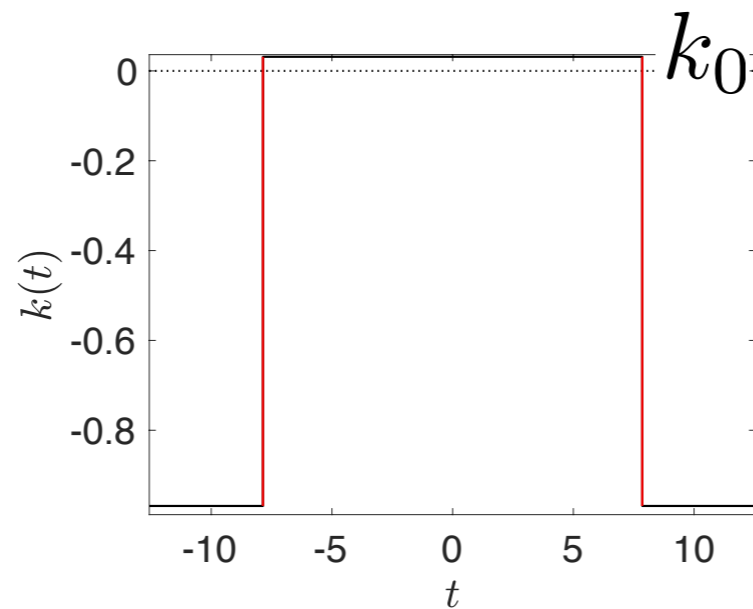
Only one
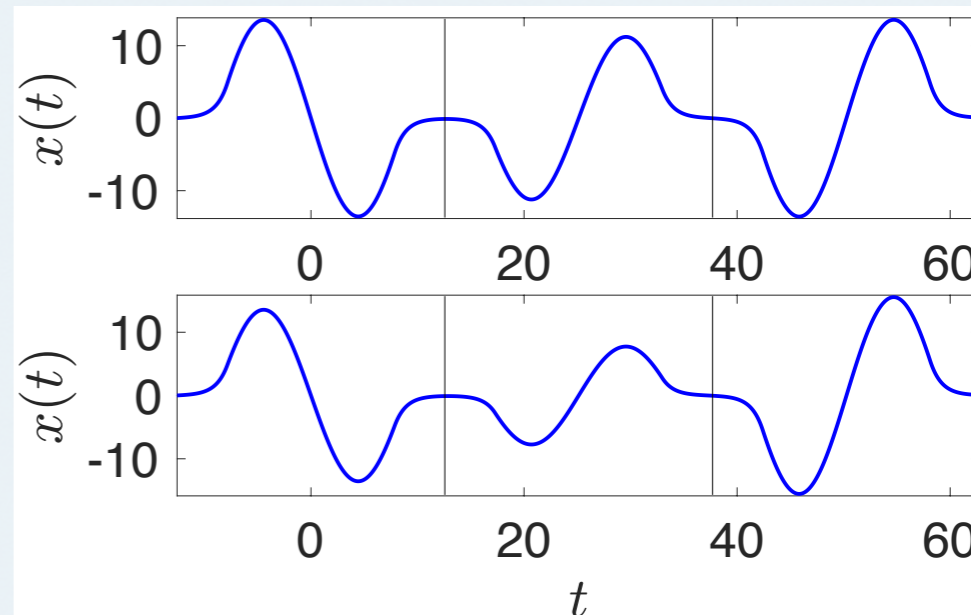time scale:
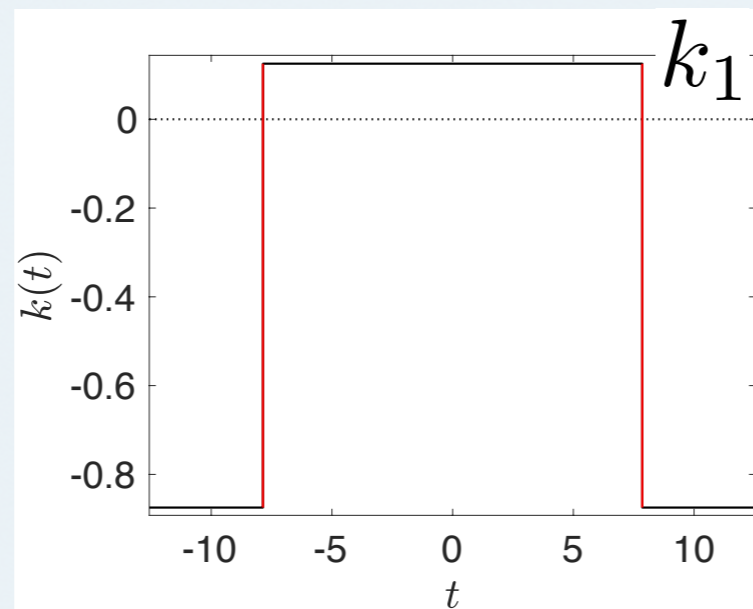
$$k(t) = k$$

Two
time scales:

$$k(t) = k(t + T)$$

Mode 0

$k_0 = 0.031437$

$\pm 10^{-6}$

Mode 1

$k_1 = 0.125271$

$\pm 10^{-6}$

BVP: $(\int_0^T \Psi^*(t)\Psi(t)dt = 1)$

$$\left(-\frac{d^2}{dt^2} + \frac{1}{m}(k - k(t))\right)\Psi(t) = \frac{k_i}{m}\Psi(t)$$

$$\Psi(-T/2) = \Psi(T/2) = 0$$