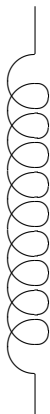
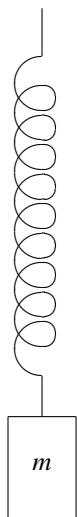
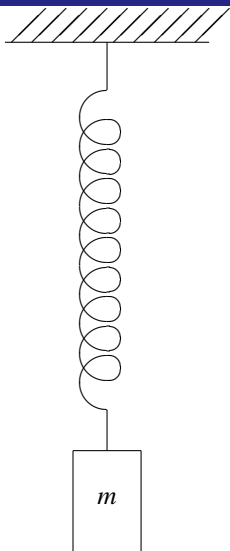


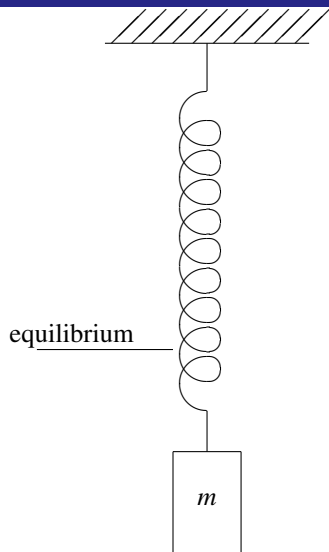
The Governing Equation(s) for a Spring-Mass-System

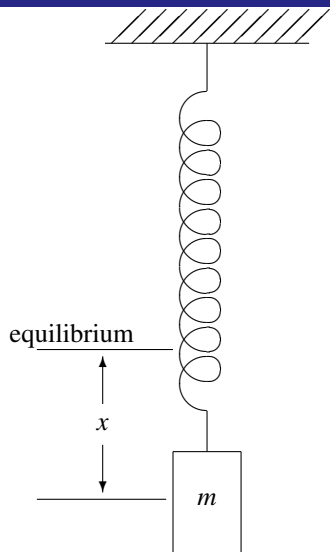
Bernd Schröder

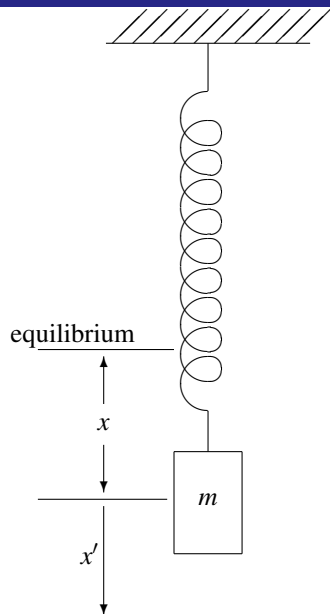


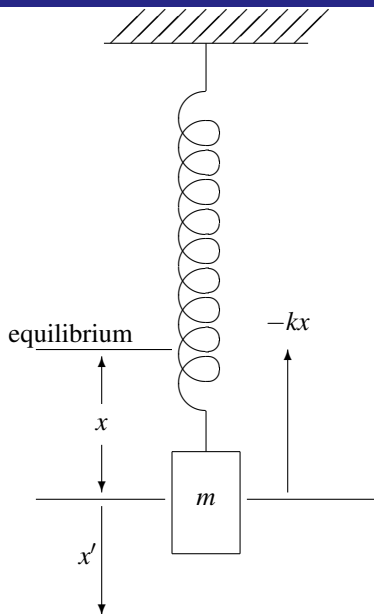


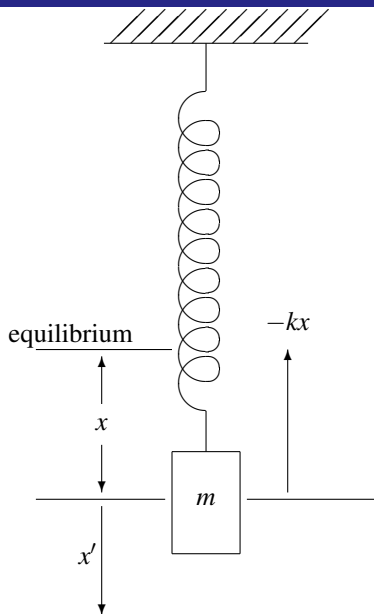




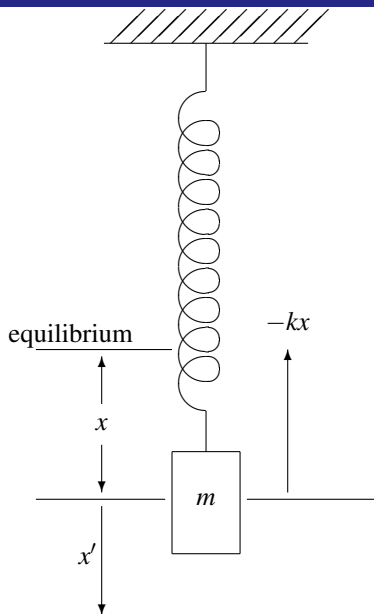






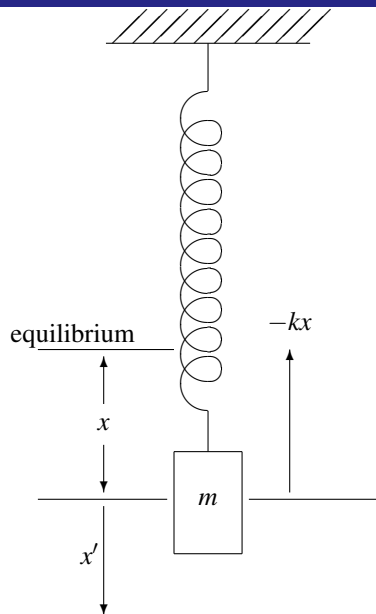


$$mx'' = -kx$$



$$mx'' = -kx$$

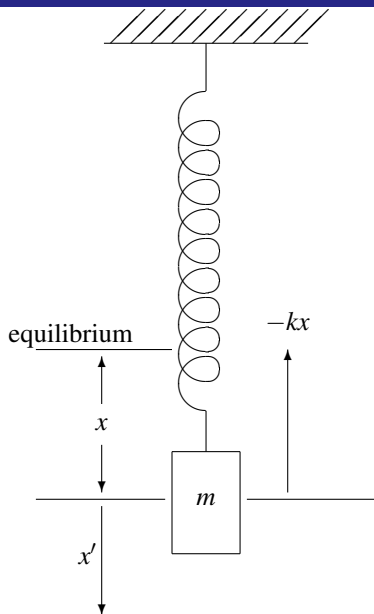
$$mx'' + kx = 0$$



$$mx'' = -kx$$

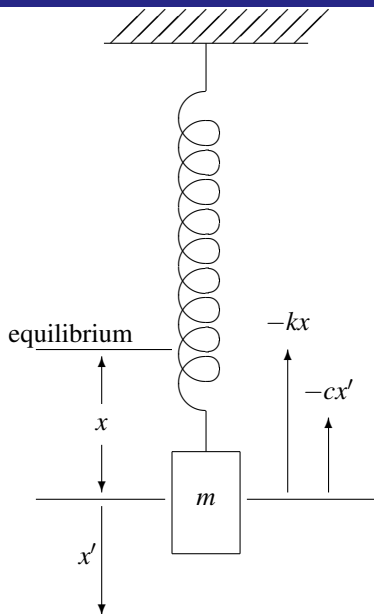
$$mx'' + kx = 0$$

Free harmonic oscillator



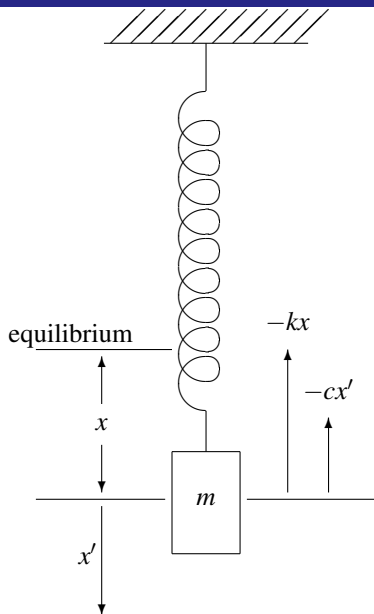
$$mx'' = -kx$$

$$mx'' + kx = 0$$



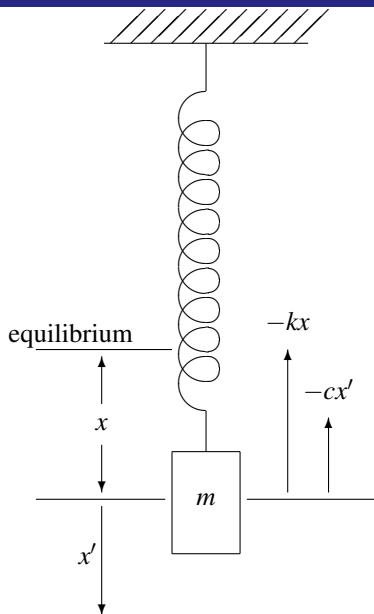
$$mx'' = -kx$$

$$mx'' + kx = 0$$



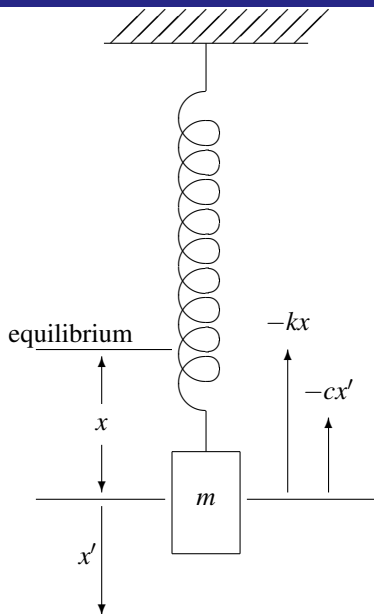
$$mx'' = -kx - cx'$$

$$mx'' + kx = 0$$



$$mx'' = -kx - cx'$$

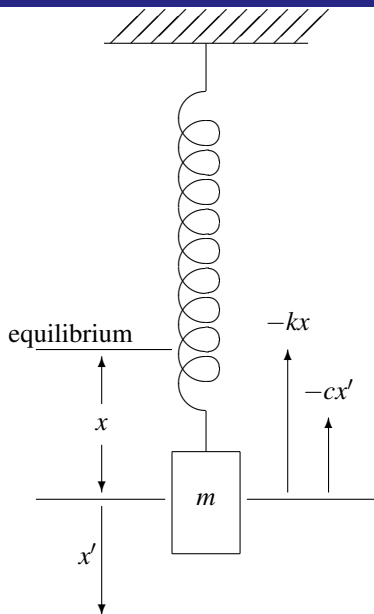
$$mx'' + cx' + kx = 0$$



$$mx'' = -kx - cx'$$

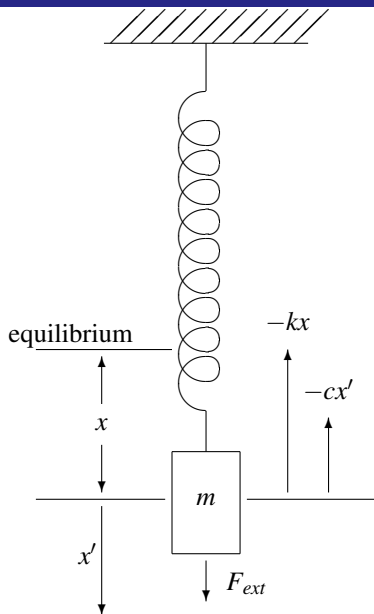
$$mx'' + cx' + kx = 0$$

Free harmonic oscillator
with damping



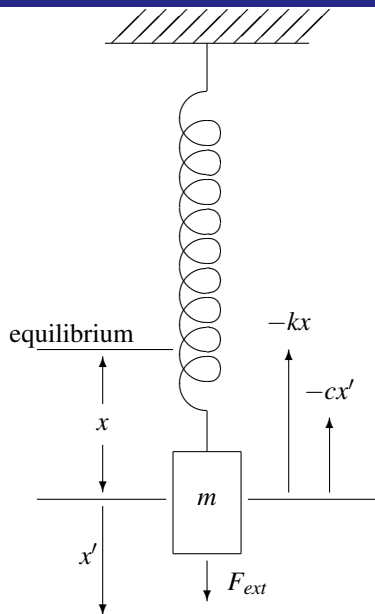
$$mx'' = -kx - cx'$$

$$mx'' + cx' + kx = 0$$



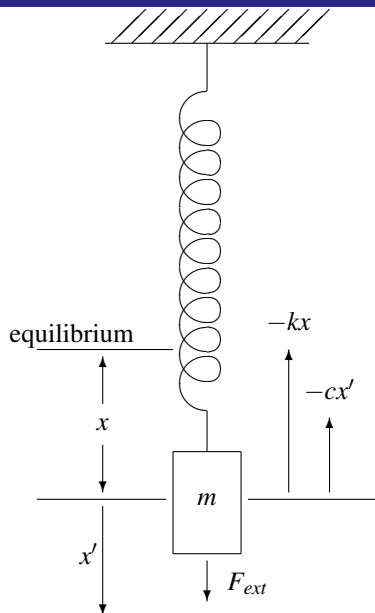
$$mx'' = -kx - cx'$$

$$mx'' + cx' + kx = 0$$



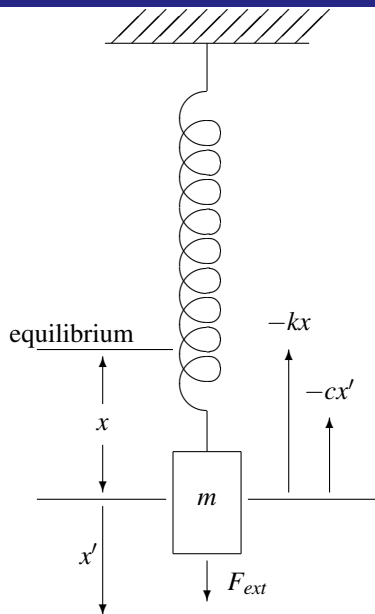
$$mx'' = -kx - cx' + F_{ext}$$

$$mx'' + cx' + kx = 0$$



$$mx'' = -kx - cx' + F_{ext}$$

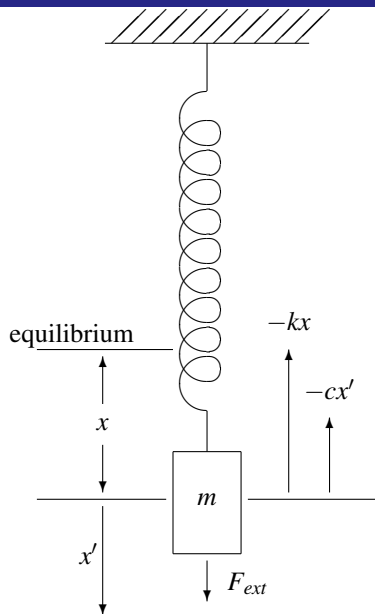
$$mx'' + cx' + kx = F_{ext}$$



$$mx'' = -kx - cx' + F_{ext}$$

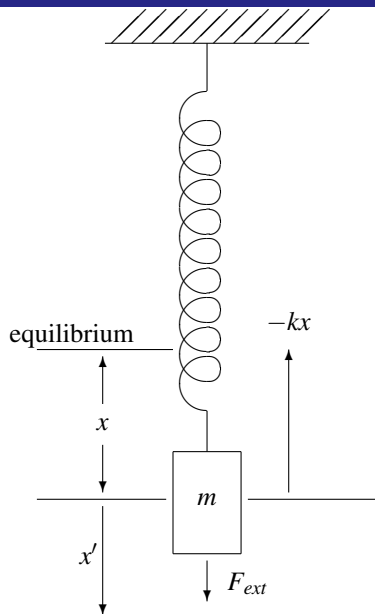
$$mx'' + cx' + kx = F_{ext}$$

Forced harmonic oscillator
with damping



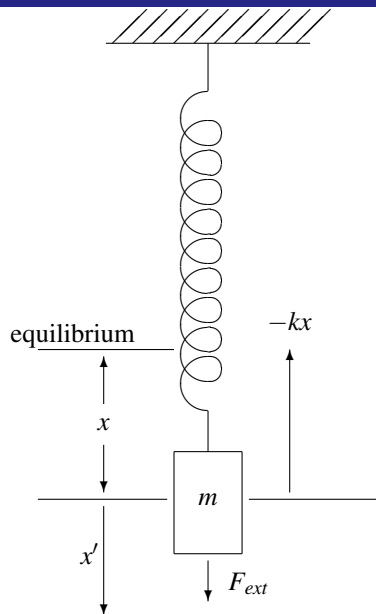
$$mx'' = -kx - cx' + F_{ext}$$

$$mx'' + cx' + kx = F_{ext}$$



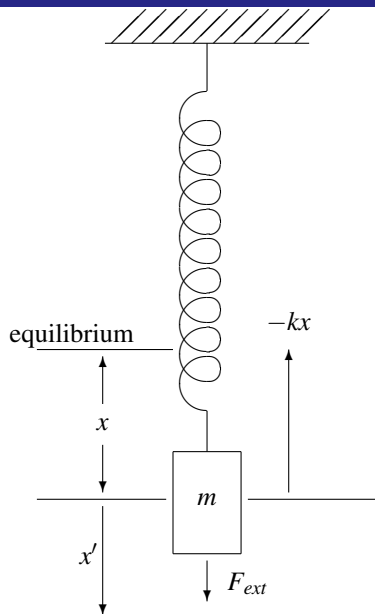
$$mx'' = -kx - cx' + F_{ext}$$

$$mx'' + cx' + kx = F_{ext}$$



$$mx'' = -kx + F_{ext}$$

$$mx'' + kx = F_{ext}$$



$$mx'' = -kx + F_{ext}$$

$$mx'' + kx = F_{ext}$$

Forced harmonic oscillator

without damping