Solution

IV.5

The equations of motion are

$$m\ddot{y} + ky = F - b\dot{y}$$

c) Equilibria.

Setting $\dot{y} = \ddot{y} = 0$ gives

$$k y_e = F_e$$

The equilibria are any (y_e, F_e) such that

$$F_e = k y_e$$

b) The equation is already in linear form.

About an equilibrium we have

$$m\ddot{\tilde{y}} + k\tilde{y} = \tilde{F} - b\dot{\tilde{y}}$$

where $\tilde{y} = y - y_e$ and $\tilde{F} = F - F_e$