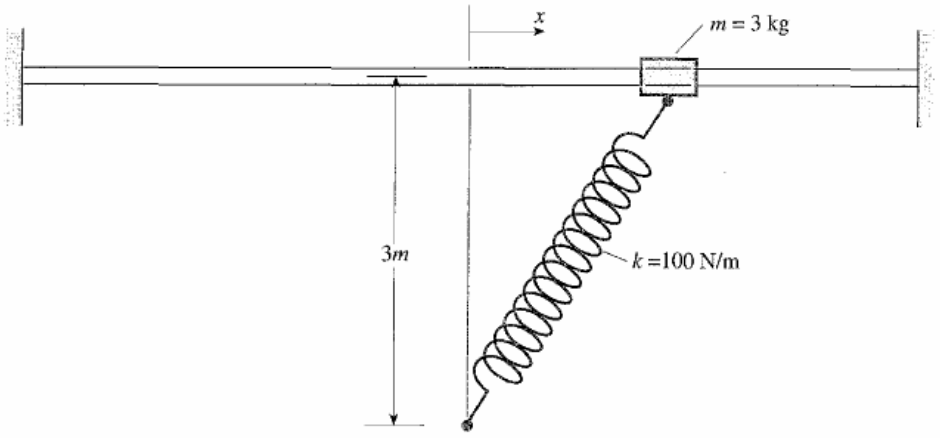
APP1. The mass in Figure moves horizontally on the frictionless bar. It is connected by a spring to a support located centrally below the bar. The unstretched length of the spring is $L = \sqrt{(10)} = 3.1623$ m (meters); the spring constant is $k =$ 100 N/m (newtons per meter); the mass of the block is 3 kg. Let $x(t)$ be the distance from the center of the bar to the location of the block at time t. Clearly the equilibrium position of the block is at $x = 1.0$ m (or $x = -1.0$ m). Let $y_0 = \sqrt{10}$ m (the unstretched length of the spring). This second-order differential equation describes the motion:



$$\frac{d^2x}{dt^2} = -\left(\frac{k}{m}\right)x\left(1 - \frac{y_0}{\sqrt{(x^2 + 9)}}\right).$$

a. Using modify euler and rungh kutta 4th order , find the position and velocity of the block between $t = 0$ and $t = 10$ sec if $x_0 = 1.4$ and the initial velocity is zero.

b. Repeat part (a), but now with the spring stretched more at the start, $x_0 = 2.5$.