

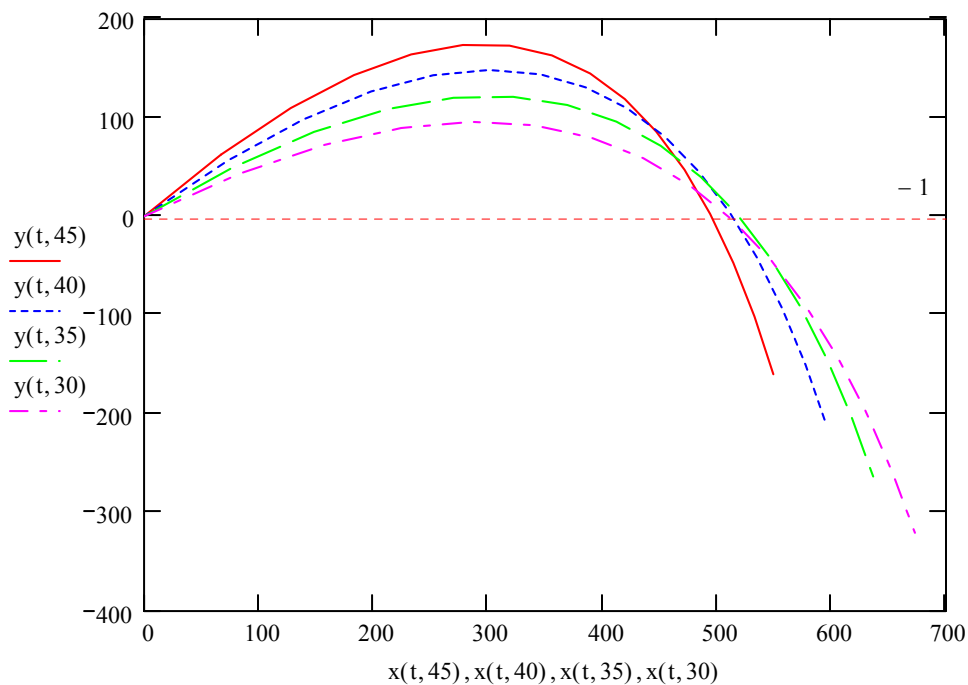
Projectile Motion with Viscous Damping Drag (from Greenwood, pg. 79)

$$x_0 := 0 \quad m := 1 \quad y_0 := 0 \quad c := 0.1 \quad v := 100 \quad g := 9.81$$

$$x(t, \theta) := x_0 + m \cdot \frac{v \cdot \cos\left(\theta \cdot \frac{\pi}{180}\right)}{c} \cdot \left(1 - \exp\left(-\frac{c \cdot t}{m}\right)\right)$$

$$y(t, \theta) := y_0 - \frac{m \cdot g \cdot t}{c} + \frac{m}{c} \cdot \left(v \cdot \sin\left(\theta \cdot \frac{\pi}{180}\right) + \frac{m \cdot g}{c}\right) \cdot \left(1 - \exp\left(-\frac{c \cdot t}{m}\right)\right)$$

$$t := 0..15$$



Maximum Range:

$$t := 15 \quad \theta := 35$$

Given

$$y(t, \theta) = 0$$

$$\text{range} := \text{Maximize}(x, t, \theta)$$

$$\text{range} = \begin{pmatrix} 10.141 \\ 35.454 \end{pmatrix}$$

$$x(\text{range}_0, \text{range}_1) = 519.095$$