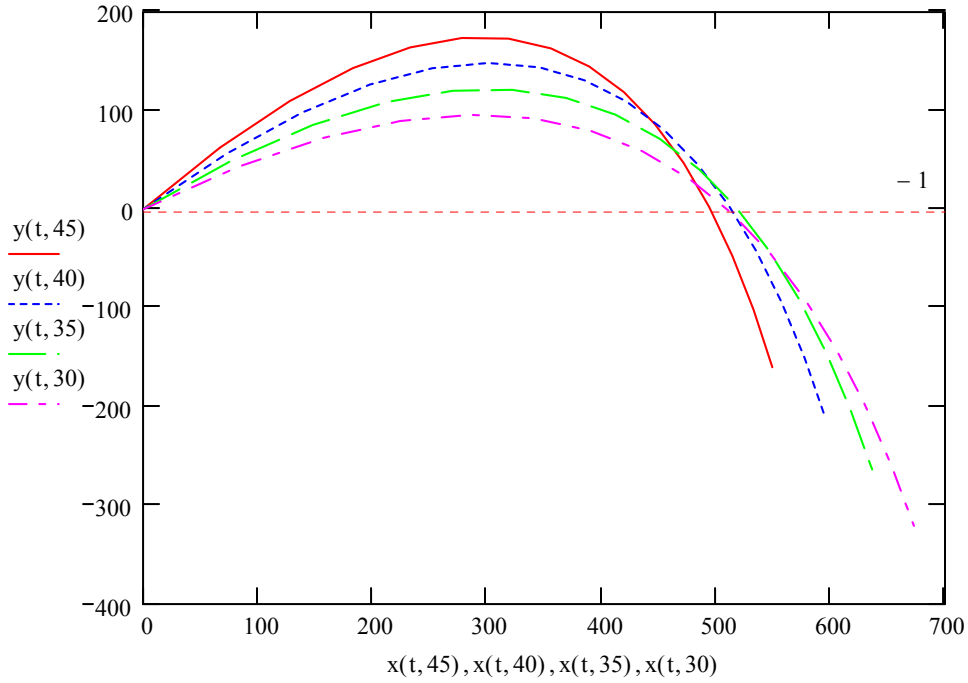
Projectile Motion with Viscous Damping Drag
(from Greenwood, pg. 79)

$x0 := 0 \qquad m := 1 \qquad y0 := 0 \qquad c := 0.1 \qquad v := 100 \qquad g := 9.81$

$$x(t,\theta) := x0 + m\cdot\frac{v\cdot\cos\left(\theta\cdot\frac{\pi}{180}\right)}{c}\cdot\left(1 - \exp\left(-\frac{c\cdot t}{m}\right)\right)$$

$$y(t,\theta) := y0 - \frac{m\cdot g\cdot t}{c} + \frac{m}{c}\cdot\left(v\cdot\sin\left(\theta\cdot\frac{\pi}{180}\right) + \frac{m\cdot g}{c}\right)\cdot\left(1 - \exp\left(-\frac{c\cdot t}{m}\right)\right)$$

$t := 0 .. 15$



Maximum Range:

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

Given

$y(t,\theta) = 0$

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

$$range = \begin{pmatrix} 10.141 \\ 35.454 \end{pmatrix} \qquad x\left(range_0, range_1\right) = 519.095$$