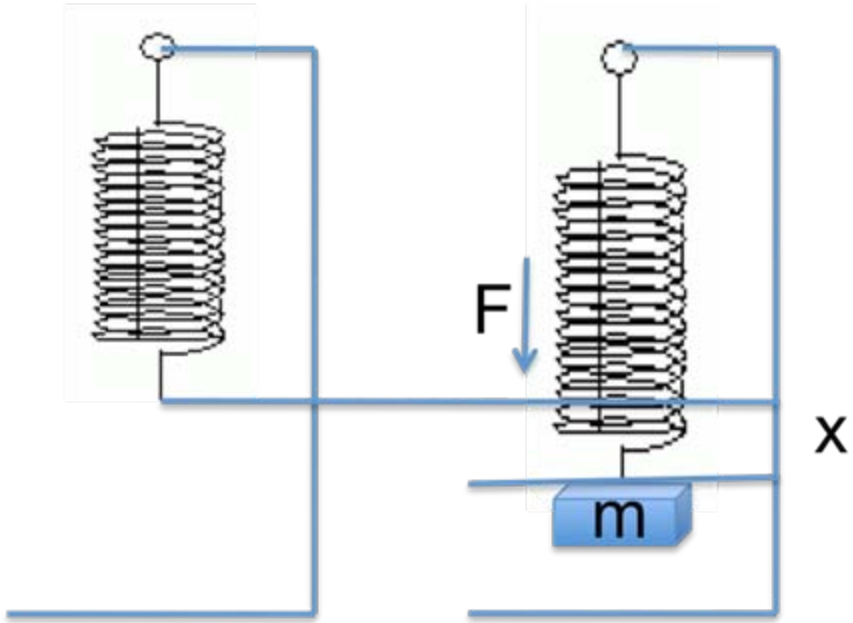

$F = - kx$

$F = ma$

$k = (m*g)/x$

$k = -(1kg * 9.81m/s^2)/0.1m = -9.81N/0.1m = -98.1N/m$

Distance (m) Mass (kg)

0.0865 0.1

0.1015 0.15

…

0.4416 0.0

0.4304 0.95

0.437 1.0

1) Trajectory given by, $y = ax^2 + bx + c$

Peak of parabola occurs halfway between launch and target, call this xMid

yPeak = x*xMid^2 + b*xMid + c

2) Time to fall from yPeak to target (height = 0), purely a function of acceleration due to gravity.

t = sqrt(2*yPeak/g)

3) This is also the time time required to go from xMid to xMax. Can easily compute the average horizontal speed over that distance. If we assume no drag, that speed is horizontal speed at which projectile hits target.

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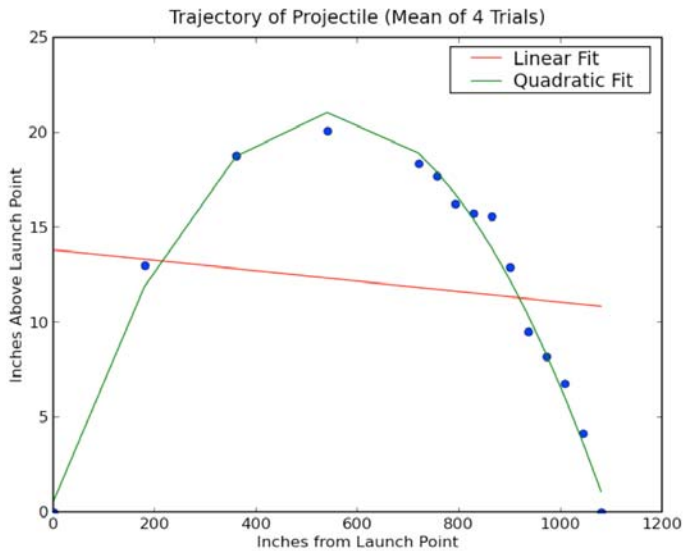

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6.00SC Introduction to Computer Science and Programming
Spring 2011