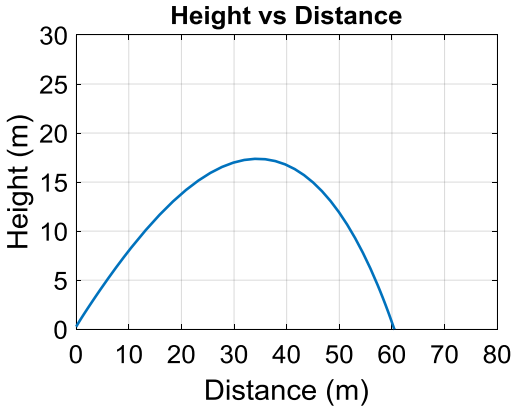
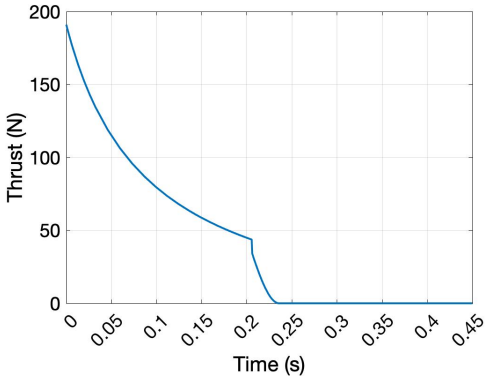
# Project 2: Verification constants, inputs and trajectory

g = 9.81 m/s2 … acceleration due to gravity
$C_d$ = 0.8 … discharge coefficient
$\rho_{air,amb}$ = 0.961 kg/m^3 … ambient air density
$Vol_{bottle}$ = 0.002 m^3 … volume of empty bottle
$P_{amb}$ = 12.1 psi … atmospheric pressure
γ = 1.4 … ratio of specific heats for air
$\rho_{water}$ = 1000 kg/m^3 … density of water
$D_{Throat}$ = 2.1 cm … diameter of throat
$D_{Bottle}$ = 10.5 cm … diameter of bottle
R = 287 J/kgK … gas constant of air
$M_{Bottle}$ = 0.15 kg … mass of empty 2-liter bottle with cone and fins
$C_D$ = 0.5 … drag coefficient
$P_{gage}$ = 50 psi … initial gage pressure of air in bottle
$Vol_{water,initial}$ = 0.001 m^3 … initial volume of water inside bottle
$T_{air,initial}$ = 300 K … initial temperature of air
v0 = 0.0 m/s … initial velocity of rocket
θ = 45° … initial angle of rocket
x0 = 0.0 m … initial horizontal distance
y0 = 0.25 m … initial vertical height
$l_s$ = 0.5 m… length of test stand

Integration time = 0sec to 5sec … tspan

**Output:**




Max height: 17.4 +/- 0.5 m
Max distance: 60.5 +/- 0.5 m