Question\_01

The range of an object shot at an angle θ with respect to the x-axis and an initial velocity Vo is given by:

For an initial velocity Vo that consists of 100 data ranging from 70 m/s to 230 m/s, and an angle θ= π/4, Calculate the maximal range and the velocity at the maximum range. Use g= 9.81m/s2

Solution :

From this equation we can figure out that the equation for the initial velocity is

We can implement this equation in MATLAB after initializing all variables

In MATLAB

%solution

%Initializing all related variables

R= linspace(70,230,100);

theta = pi/4;

g = 9.81;

V0 = sqrt(sin(2\*theta)./(R\*g))

Question\_02

Write a MATLAB command to calculate v and w for: a = 6 ; 3≤ x≤5; and 5≤ y ≤12

(x and y are vectors of the same size containing 5 elements)

%solution

%Initializing all related variables

a=5;

%x will result in fractional values

x=linspace(3,5,5);

y=linspace(5,12,5);

v=exp(-a)\*(sin(x)).^2 + 8\*(log(y.^2 + 1)).^0.5

w= (abs(y-asin(x./(factorial(x)+3)))+2) ./ (nthroot(x,3)./y.^2+cos(sqrt(abs(x))))

%factorial function input must be real non-negative integers , in this case

%the second equation will result in error.

%we can change by using rounding commands, round, fix ,ceil, floor

%w= (abs(y-asin(x./(factorial(fix(x))+3)))+2) ./ (nthroot(x,3)./y.^2+cos(sqrt(abs(x))))