

**SCHOOL OF HEALTH SCIENCES**

**DEPARTMENT OF MEDICAL ENGINEERING**

**HANDGUN SIMULATION CODE**

**MEMBERS**

*WEKESA EDITH HB/107/G/11149/20*

*MBACHI JAMES CHEGE HB107/G/15210/21*

*OSCAR ROLLEX SANYA HB107/G/14764/21*

*ANTHONY NGUGI KIVINDIO HB101/G/8821/20*

*NEWTON ETABALE HB107/G/14772/21*

% Constants (as previously defined)

initial\_velocity = 300; % m/s

launch\_angle = 5; % degrees

caliber = 0.44; % m

mass\_of\_gun = 1.53; % kg

distance = 1593.1; % m

g = 9.81; % m/s^2 (acceleration due to gravity)

% Convert launch angle to radians

launch\_angle = deg2rad(launch\_angle);

% Calculate time of flight

time\_of\_flight = (2 \* initial\_velocity \* sin(launch\_angle)) / g;

% Time vector

t = linspace(0, time\_of\_flight, 1000);

% Calculate x and y coordinates of the trajectory

x = initial\_velocity \* cos(launch\_angle) \* t;

y = initial\_velocity \* sin(launch\_angle) \* t - 0.5 \* g \* t.^2;

% Calculate velocity as a function of time

v = initial\_velocity - g \* t;

% Create a figure

figure;

% Plot velocity against time

subplot(2, 1, 1);

plot(t, v);

xlabel(&#39;Time (s)&#39;);

ylabel(&#39;Velocity (m/s)&#39;);

title(&#39;Bullet Velocity vs. Time&#39;);

grid on;

% Plot the trajectory

subplot(2, 1, 2);

plot(x, y);

xlabel(&#39;Horizontal Distance (m)&#39;);

ylabel(&#39;Vertical Distance (m)&#39;);

title(&#39;Bullet Trajectory&#39;);

grid on;