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ECE 8873 - Homework 3.2

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```
clear all; close all;
```

Initalization

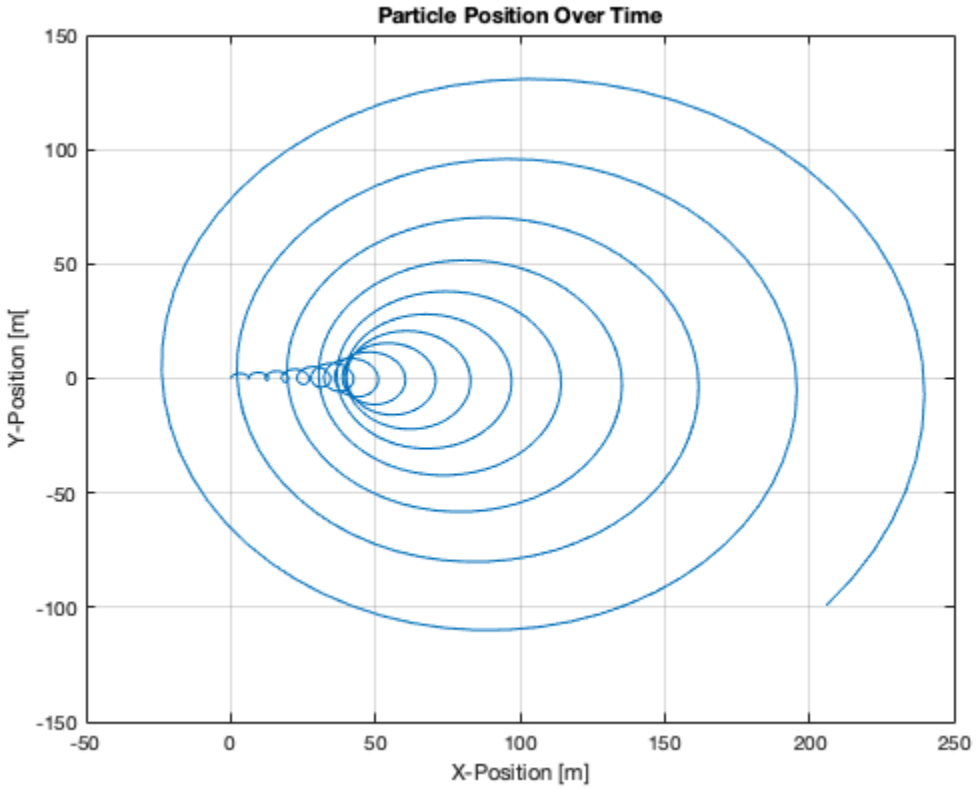
Constants

```
dt = 0.1; % timestep
q = 1; % charge (normalized)
m = 1; % mass (normalized)
E = [0, 1, 0]; % E field
B = [0, 0, 1]; % B field
nsteps = 1000; % number of loop iterations

% Velocity
v = zeros(1,3); % vector velocity for single time

% Position
x = zeros(1, length(nsteps)); % x positions over time
y = zeros(1, length(nsteps)); % y positions over time
```

Calculation Loop

```
for i=2:nsteps

    % Update Forces
    fE = q*E;
    fB = q*cross(v,B);

    % Update Accleration
    a = (fE + fB)/m;

    % Update Velocity
    v = v + a*dt;

    % Update Position
    x(i) = x(i-1) + v(1)*dt + 0.5*a(1)*dt^2;
    y(i) = y(i-1) + v(2)*dt + 0.5*a(2)*dt^2;


end
```

```
% Generate Plots
plot(x,y);
xlabel('X-Position [m]');
ylabel('Y-Position [m[');
title('Particle Position Over Time');
grid on;
```



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