py for physics assignment 1

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June 2022

Q1

Using the initial value problem solver from matplotlib, this was the solution I obtained from 1 micro second. As we can see it's only accelerated in the Y direction, which is just what we except since the only force is a cross product between the velocity in the x direction and a magnetic field in the Z direction.

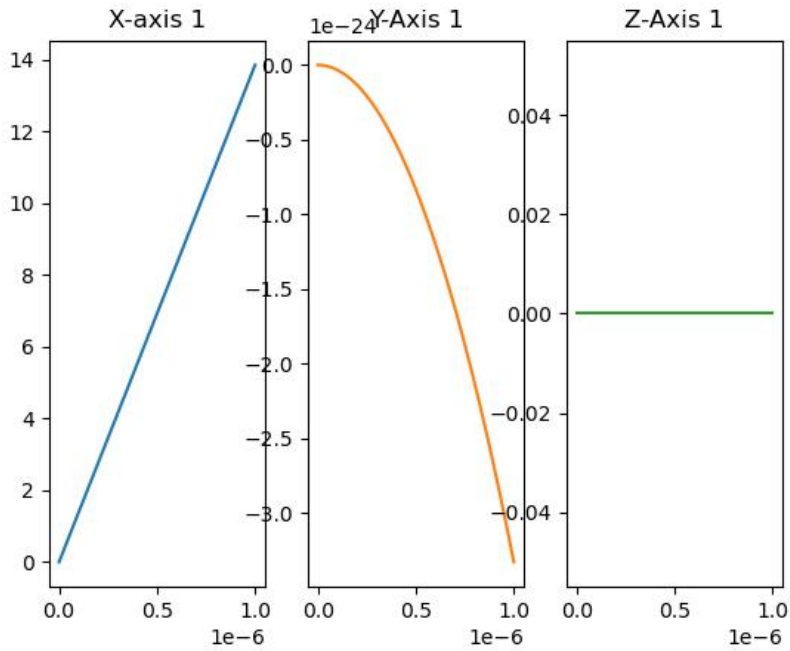

Figure 1:

Q2

This question was solved in a similar fashion. We see here no real difference in how the proton was accelerated in the Y direction, this is because a cross product between the velocity's Z component and the magnetic field in the Z direction will be 0. So only the X velocity impacts it.

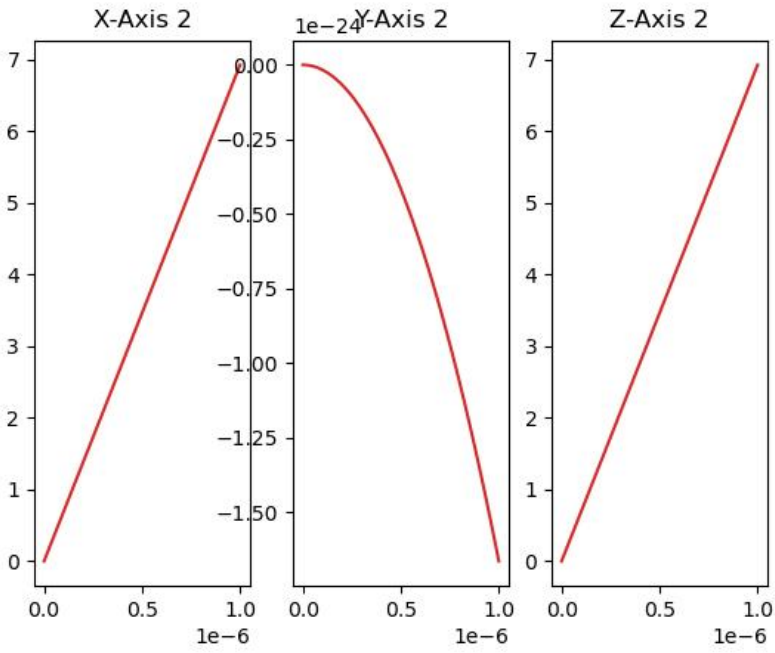

Figure 2: Figure 2

Q3

Below is a 3D figure created using Axes3D. It's quite cluttered to read any precise measurements without being able to interact with the image. However we see that the proton is following the expected trajectory for being in such a strong (3 Tesla) magnetic field.

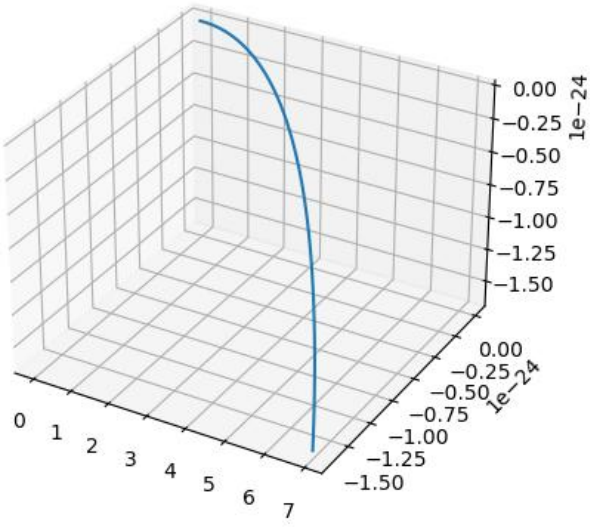

Figure 3: Figure 3