

## PROGRAMMING ASSIGNMENT 7: LORENTZ FORCE

- Write a program to solve the Lorentz force problem in 3D using the RK4 algorithm for a charged particle moving in a region with both electric and magnetic fields. Use array-vector notation in your code. Use initial conditions  $q = 1.0$  C,  $m = 1.0$  kg,  $\vec{r}_0 = (0, 0, 0)$  m,  $\vec{v}_0 = (1.0, 0, 0)$  m/s,  $\vec{E} = (0, 0.01, 0.1)$  N/C, and  $\vec{B} = (0, 0, 0.1)$  T (this should give you helical motion). Note that the force is now velocity rather than position dependent.
- Generate a 3D plot of the particle's trajectory using the gnuplot surf command.