PHY 711 – Assignment #7

September 12, 2017

1. Consider a Lagrangian describing the motion of a particle of mass m and charge q given by

$$L(x, y, z, \dot{x}, \dot{y}, \dot{z}) = \frac{1}{2} m \left(\dot{x}^2 + \dot{y}^2 + \dot{z}^2 \right) + \frac{q}{c} B \dot{y} x.$$

Here c denotes the speed of light and B represents the magnitude of a constant magnetic field along the z-axis. Determine the Euler-Lagrange equations of motion for the particle and discuss how the motion compares with the similar example discussed in class.