PHY 711 – Assignment #10

9/17/2014

Continue reading Chapters 3 and 6 in Fetter and Walecka.

1. Consider the Lagrangian:

$$L(\alpha,\beta,\gamma,\dot{\alpha},\dot{\beta},\dot{\gamma}) = A\left(\dot{\alpha}^2\sin^2\beta + \dot{\beta}^2\right) + B\left(\dot{\alpha}\cos\beta + \dot{\gamma}\right)^2 - C\cos\beta.$$

In this expression, A, B, and C represent given constant parameters. [You may (and will later) recognize this Lagrangian from the motion of a symmetric top.]

Find three constants of motion for this system. (It is not necessary to simplify the expressions.)