

HOMEWORK ASSIGNMENT # 7
DUE: TUESDAY, 29 MAY 2007

Goldstein et al. Chapter 6

Exercises 5, 12, 16

Deduce Hamilton's equations of motion for the following problems and identify any cyclic coordinates:

- (i) the spherical pendulum (spherical polar coordinates)
- (ii) the symmetric top with one point fixed in a gravitational field (Euler angles)
- (iii) central force motion with an harmonic potential $\frac{1}{2} kr^2$ (Cartesian coordinates)
- (iv) a relativistic particle of rest mass m_0 moving along the x-axis under a potential $V(x)$. Hint: $L = m_0 c^2 \{ 1 - [1 - (dx/dt)^2/c^2]^{1/2} \} - V(x)$