Homework No. 03 (Spring 2017)

PHYS 510: Classical Mechanics

Due date: 2017 Feb 9 (Thursday) 4.30pm

1. (**20 points.**) Refer Goldstein, 2nd edition, Chapter 2 Problem 2.
   Show that the geodesics of a spherical surface are great circles, that is, circles whose centers lie at the center of the sphere.

2. (**20 points.**) Based on Problem 7 in Chapter 2 of Goldstein, 2nd edition.
   Catenoid: A rope of uniform linear mass density and indefinite length passes freely over pulleys at equal heights $y_1 = y_2$, above the surface of Earth, with horizontal distance $x_2 - x_1$ between them. (Assume uniform gravitational field.) Determine the curve followed by the rope hanging between the pulleys. Compare (using plots) the catenoid and a parabola.