

**Physics 4222**  
**Mechanics II**  
**Problem Set VI**

Due: Friday, Oct. 21, 2016

**6.1** Problem 8.29, Taylor, (Pg. 324).

**6.2** Problem 8.32, Taylor, (Pg. 325).

**6.3** A spacecraft near the planet mars is orbiting the sun in a circular orbit of radius approximately 1.5 AU, (AU = astronomical unit). The spacecraft then transfers to a circular orbit close to earth (radius 1 AU) through two tangential thrusts applied at opposite ends of the appropriate elliptical transfer orbit. (Note that this is essentially the reverse of what happens in the example done in class, as well as in the closely related Example 8.6 in Taylor (pp. 318-319).)

- (a) Determine the two thrust factors required for this orbit change.
- (b) Show that the ratio of the speed of the spacecraft in the initial and final circular orbits is consistent with the result of Problem 6.2.
- (c) Determine the time the spacecraft spends on the transfer orbit from mars to earth.

**6.4** Problem 9.1, Taylor, (Pg. 360).

**6.5** Problem 9.9, Taylor, (Pg. 361).

**6.6** Problem 9.14, Taylor, (Pg. 362).