PHYS 331 — Problem Set #10

Reading: Taylor 8.1 – 8.6

Problems to be handed in Friday 10/25:

- In class on Wednesday you will work on code for the "two-body problem" (in nondimensional variables). Submit cleaned up Jupyter notebooks with orbits for two cases:
 - $r(0) = 1, \dot{r}(0) = 0,$
 - $r(0) = 2, \dot{r}(0) = 0.$

For each of these cases, estimate from your program the following quantities:

- (a) semi-major axis of the orbit,
- (b) period of the orbit (is the period in the second case what you would predict from Kepler's third law?), and
- (c) eccentricity of the orbit.
- 2. Write the energy for the "two-body problem" in terms of our non-dimensional parameters. For what values of r' will you get unbounded orbits? Use your code to check your prediction.
- 3. Taylor 8.5
- 4. Taylor 8.9
- 5. Taylor 8.12
- 6. Taylor 8.14
- 7. Taylor 8.18