

**Physics 3221**  
**Fall Term 2018**  
**Homework Problem Set 9**

Due Monday November 19, 12:50 pm (in class). If you are going to miss class on Monday, make sure you turn in the homework early (on Friday the 16th).

**Reading:** Sections 7.1-7.5 from Chapter 7. This homework has a total of 9  $\star$ s.

**Problem 1. Particles on a spring in 1 dimension.** Problem 7.8 $\star\star$  from the textbook.

**Problem 2. Lagrange with friction.** Problem 7.12 $\star$  from the textbook.

**Problem 3. Acceleration of a yoyo.** Problem 7.14 $\star$  from the textbook.

**Problem 4. Bead on a helix.** Problem 7.20 $\star$  from the textbook.

**Problem 5. Pendulum in an elevator.** Problem 7.22 $\star$  from the textbook.

**Problem 6. Oscillator inside a rocking cart.** Problem 7.23 $\star$  from the textbook.

**Problem 7. Double Atwood machine.** Problem 7.27 $\star\star$  from the textbook. For grader's convenience, choose your two generalized coordinates to be:  $x$ , the distance from the top pulley down to the lower one, and  $y$ , the distance from the lower pulley to the mass  $3m$ .