The following two problems come from *Classical Dynamics of Particles and Systems*, Fifth Edition (2004), by Stephen T. Thornton and Jerry B. Marion. We will include air resistance later; for now, just make sure that you know how to do these problems that ignore air resistance. If you have solved these before, please do them again *without the aid of any previous solutions*.

- **Problem 2-6 on page 91 ⇒ (10 points)** In the blizzard of ’88, a rancher was forced to drop hay bales from an airplane to feed her cattle. The plane flew horizontally at 160 km/hr and dropped the bales from a height of 80 m above the flat range. (a) She wanted the bales of hay to land 30 m behind the cattle so as to not hit them. Where should she push the bales out of the airplane? (b) To not hit the cattle, what is the largest time error she could make while pushing the bales out of the airplane? Ignore air resistance.

- **Problem 2-17 on page 92 ⇒ (10 points)** A strong softball player smacks the ball at a height of 0.7 m above home plate. The ball leaves the player’s bat at an elevation angle of 35° and travels toward a fence 2 m high and 60 m away in center field. What must the initial speed of the softball be to clear the center field fence? Ignore air resistance.

The following problem comes from *Computational Physics* (Second Edition - 2006), by Nicholas J. Giordano and Hisao Nakanishi.

- **(20 points)** Reproduce Figure 2.2 on page 23. Thoroughly read Section 2.1 (pages 18-24) dealing with the forces involved in bicycle racing. Use the parameters given by Giordano and Nakanishi, except for ∆t; just choose enough points to generate the result. Include a copy of your code with your graph.

Due date: **12 September 2013** *(beginning of class)*