ECE 463/663 - Homework #4

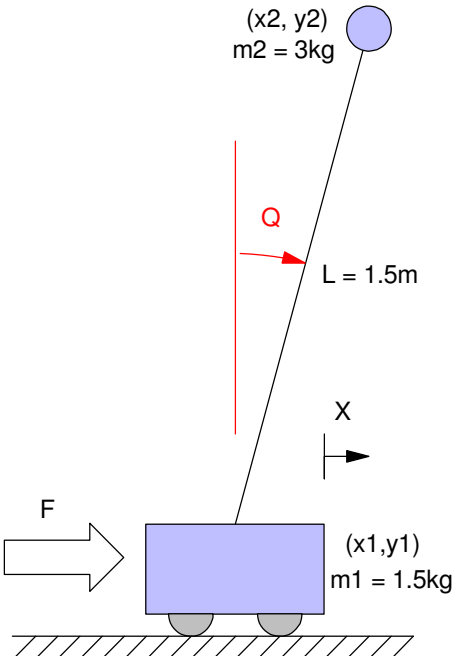
LaGrangian Dynamics. Due Monday, February 10th

Cart & Pendulum

1) (30pt) Derive the dynamics for an inverted pendulum where

- m1 = 1.5kg (mass of cart)
- m2 = 3kg (mass of ball)
- L = 1.5m (length of arm)

Fine the linearized dynamics at x = 0, θ = 0



Ball and Beam

2) (30pt) Derive the dynamics for a ball and beam system where

- J = 0.7 kg m^2 (the inertia of the beam)
- m = 2.2 kg (the mass of the ball)

Find the linearized dynamics at r = 1.0m, θ = 0