ECE 463/663 - Homework #4

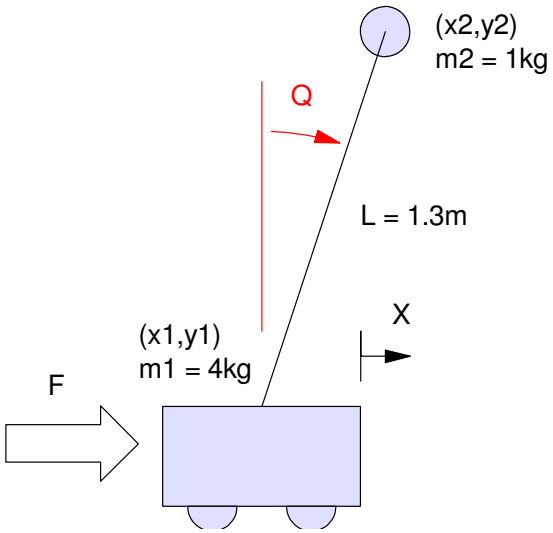
LaGrangian Dynamics. Due Monday, February 5th
Please submit as a hard copy or submit on BlackBoard

Cart & Pendulum

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

- m1 = 4kg (mass of cart)
- m2 = 1kg (mass of ball)
- L = 1.3m (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 = 2 kg m2 (the inertia of the beam)
- m = 3kg (the mass of the ball)

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