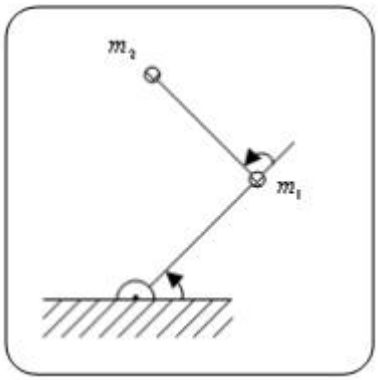
MMC Homework 6

The current configuration of a Two link manipulator under gravity is given below as you can see the class material for chap. 6.

mass parameter $m_1 = 10\text{kg}$, $m_2 = 5\text{kg}$, $l_1 = l_2 = 0.5m$



$$\theta_1(0) = 30^\circ \quad \theta_1(t_f) = 150^\circ \qquad t_f = 1\,\text{sec}$$
$$\dot{\theta}_1(0) = 0 \quad \dot{\theta}_1(t_f) = 0$$
$$\theta_2(0) = 150^\circ \quad \theta_2(t_f) = 30^\circ$$
$$\dot{\theta}_2(0) = 0 \quad \dot{\theta}_2(t_f) = 0$$

1) Do trajectory planning with a cubic polynomial for the two joints of the manipulator.

   Using the dynamic equation in Text,

2) perform PD control simulation.(Simulink is also accepted)
3) perform PD+ gravity control simulation.
4) perform computed torque control simulation.
5) compare errors of 3 cases above.