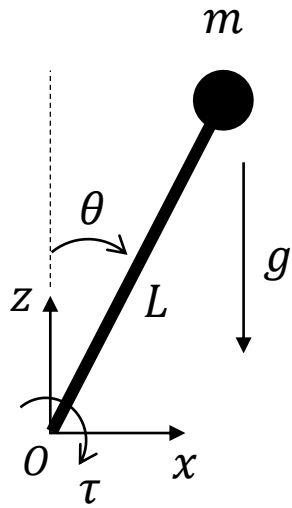# ME729 Advanced Robotics - Homework #7

4/02/2018

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Email me *a pdf file* by next Monday 6 p.m.

- Consider the following system given by the lecture.
- Let m = 35 kg, L = 0.9 m.
- Initial conditions : $\theta = 0$ and $\dot\theta = 0.35\ rad/s$

$$\begin{bmatrix} \dot\theta \\ \ddot\theta \end{bmatrix} = \begin{bmatrix} 0 & 1 \\ \dfrac{g}{L} & 0 \end{bmatrix} \begin{bmatrix} \theta \\ \dot\theta \end{bmatrix} + \begin{bmatrix} 0 \\ \dfrac{1}{mL^2} \end{bmatrix} \tau$$

1. Using Simulink, realize PID control, and control the system to keep it upright. [4]

2. When desired poles are -4, and -5, find feedback gains using pole-placement method. [2]

3. Implement the pole-placement method through Simulink, and control the system to keep it upright. [4]