

ECE 489 Robotics Dynamics and Control

Homework # 6

Due Date: 05/01/2007

1. Consider the reaction wheel pendulum model

$$\begin{aligned}I_1\ddot{q}_1 + Mg\ell \sin(q_1) &= -\tau \\ I_2\ddot{q}_2 &= \tau\end{aligned}$$

Express the system as

$$\dot{x} = f(x) + g(x)u$$

Show that the system is feedback linearizable. Is the feedback linearization local or global? If it's local, find the region where it is valid.

2. Problem 10-5
3. Problem 10-15
4. Problem 10-17
5. Problem 10-22

If you have the preliminary paperback version of the text, please check to make sure you are doing the correct problems.