

# ECE 489 Robotics Dynamics and Control

## Homework # 2

**Due Date: 02/13/2007**

The first three problems are from the textbook. If you have the preliminary paperback version, please check to make sure you are doing the correct problems.

1. Problem 7-12
2. Problem 7-13
3. Problem 7-14. Do this problem using Hamilton's Equations from Problem 7-13. Do not just repeat the proof given in class.
4. Consider the manipulator shown below for which you derived the kinematics in Homework Assignment # 1:
  - (a) Choose generalized coordinates and derive the Euler-Lagrange equations of motion. It is permissible to use *Robotica* for this.
  - (b) Compute explicitly the *Regressor*, i.e., the function  $Y(q, \dot{q}, \ddot{q})$  and parameter vector  $\Theta$  so that

$$D(q)\ddot{q} + C(q, \dot{q})\dot{q} + g(q) = Y(q, \dot{q}, \ddot{q})\Theta$$

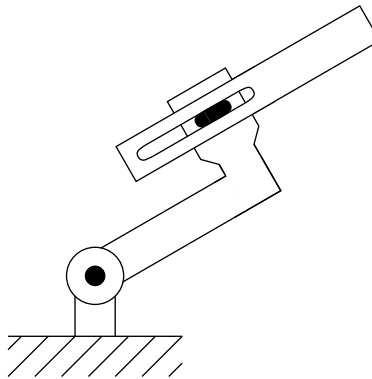


Figure 1: A two-link RP manipulator