ENME 621
Robust and Adaptive Linear Control — Prof. M. Krstic

Homework 4

Due October 17, 1995

1. Green & Limebeer, Problem 5.2.

   (Classical derivation of optimal control via calculus of variations.)
   Hint: in Part 5, use the poperty stated in Problem 3.3(3).
   You do not have to prove invertibility in Part 6.

2. Green & Limebeer, Problem 5.4.

   HARD, but try to do as much as you can.
   You do not have to give the three reasons asked in Part 1.
   Hints:

   - Use Theorem 3.2.1 in Part 2.
   - In Part 3, use the version of bounded real lemma quoted in the Note on page 111.

   Part 4 is crucial (and famous). It establishes robustness of optimal controllers. Sketch a Nyquist diagram and draw the phase and gain margin conclusions.

3. Green & Limebeer, Problem 5.5.

   You do not have to discuss the existence of P_α in Part 1.

4. Green & Limebeer, Problem 5.14.

   Important—practice the measurement feedback design from Section 5.4.