**Homework #2**

**ChE 391**

**Due 2/16/12**

1. For the system in slide 19 (Optimal Control file), determine the value of *R* that will keep $\left|u\right|\leq 1 for x\_{1}\left(0\right)=x\_{2}\left(0\right)=1 and Q=I.$

For this value of *R*, determine the time required to reach within some small tolerance (e.g., 1%) of the origin. Compare with the minimum time trajectory on the phase plane.

1. For the same system in problem 1 *(R=1),* integrate the dynamic Riccati equation with MATLAB and determine when the value of ***P*** *(t)* converges to within 1% of its steady state value.