151-0563-00 **Dynamic Programming and Optimal Control** (Fall 2008)

Problem Set #3   Topic: Deterministic Continuous-Time Optimal Control

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1. In the LQR problem we assumed that

   (a) the optimal cost to go is of the form $x^T K(t) x$,

   (b) the matrix $K(t)$ is symmetric.

   To rigorously show that (a) is true a-priori is not trivial, and is beyond the scope of the class. We will tackle (b): prove that if the optimal cost to go is of the form $x^T K(t)x$, then one can assume, without loss of generality, that $K(t)$ is symmetric.

2. BERTSEKAS, p. 143, exercise 3.2

3. BERTSEKAS, p. 144, exercise 3.5

4. BERTSEKAS, p. 145, exercise 3.7

Exercises 2 to 4 are taken from the book *Dynamic Programming and Optimal Control by Dimitri P. Bertsekas, Vol. I, 3rd edition, 2005, 558 pages, hardcover.*