Theoretical Questions for the Final Exam in 332: 510 — Spring 2000

1. Define and solve the linear-quadratic continuous-time optimal control problem with hard constraints using the transition matrix approach (Bryson, p. 243–245; Class note (8), p. 7–8).
2. Define and solve the linear-quadratic continuous-time optimal control problem with hard constraints using the Riccati equation approach (Bryson, p. 246–247; Class note (8), p. 9–11).
3. Define and solve the linear-quadratic discrete-time optimal control problem with hard constraints using the transition matrix approach (Bryson, p. 251–252; Class note (8), p. 14–15).
4. Formulate and solve the general continuous-time linear two point boundary value problem (Bryson, p. 250–251; Class notes (8), p. 12–13).
5. Define and solve the linear-quadratic continuous-time regulator problem and derive the corresponding algebraic Riccati equation (Bryson, 261–262; Class notes (10), p. 1).
6. Show that the continuous-time Hamiltonian matrix has eigenvalues that are symmetric with respect to the imaginary axis (Bryson, 263; Class notes (10), p. 2).
7. Present the eigenvector method for solving the algebraic Riccati equation (Bryson, 263–264; Class notes (10), p. 3).
8. Define and solve the linear-quadratic discrete-time regulator problem and derive the corresponding algebraic Riccati equation (Bryson 281; Class notes (10), p. 4–5).
9. Derive the expression for the optimal value of the performance criterion for the linear-quadratic continuous-time regulator problem (Class notes (10), p. 7–8).