

ISyE 6664 Stochastic Optimization

Fall 2012

Assignment 4

Issued: November 6, 2012

Due: November 13, 2012

Problem 1

Consider the following nonlinear optimization problem.

$$\begin{aligned} \min \{ & \max \{ r(x_1), \dots, r(x_n) \} \} \\ \text{s.t. } & \sum_{j=1}^n x_j \geq k \\ & x_j \geq 0 \quad \forall j \end{aligned}$$

where r is an increasing function. Formulate and solve this problem using Dynamic Programming.

Problem 2 (Linear-Quadratic Control Problem with Random System Matrices)

Consider the linear-quadratic control problem from class. Suppose that matrices A_t, B_t are random, A_t and B_t are not necessarily independent, but (A_t, B_t) and w_t are independent, and $\{(A_t, B_t, w_t)\}_{t=0}^T$ is an independent sequence. Derive an inductive expression for the optimal value function and optimal policy.