edX

# Linear Optimal Control
## Linear Optimal Control

0.0/25.0 points (graded)
Consider the scalar equation

$$\dot{x} = -4x + 2u,$$

and the infinite horizon cost function

$$J = \int_0^\infty \left[32x^2 + u^2\right] dt.$$

(a) Assume that the optimal cost-to-go function is of the form $J^\star = px^2$. What value of $p$ satisfies the Hamilton-Jacobi-Bellman conditions for optimality?

(b) Given that the optimal feedback controller associated with $J^\star$ is $u^\star = -Kx$, what is the value of $K$?

(c) Suppose we change our cost to the following:

$$J = \int_0^\infty \left[96x^2 + 3u^2\right] dt.$$

Which of the following statements is true? (Select all that apply)

☐ The optimal controller (K) gets multiplied by 3

☐  The optimal controller (K) gets divided by 3

☐  The optimal cost-to-go gets multiplied by 3

☐  The optimal cost-to-go gets divided by 3

☐  None of the above

| Submit | You have used 0 of 2 attempts |
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