

Assignment 10

due: Tuesday, May 29, in class

Problem 1: Consider the problem

$$\max \sum_{t=0}^2 \beta^t \ln u_t, \quad x_{t+1} = Ax_t^\alpha - u_t, \quad x_0 \text{ given}, \quad x_3 = 0$$

- Solve the problem using standard optimization.
- Find the value functions and the corresponding optimal control functions for each time period.
- Use the optimal controls to find the path of x_t .

Problem 2: Consider the problem

$$\max \sum_{t=0}^{\infty} \beta^t (-e^{-u_t} - 0.5e^{-x_t}), \quad x_{t+1} = 2x_t - u_t, \quad x_0 \text{ given}$$

and suppose that the value function takes the general form $J(x) = -\alpha e^{-x}$.

- Verify the functional form of the value function.
- Find the parameter α .
- Use the optimal control function to find the path of x_t .