

Homework 2

OSE Summer-school

2019

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Instructions:

- Please work in groups.

Questions:

1 The Stochastic Ramsey model - time iteration collocation

(Discrete shocks) Suppose there is a single agent with $\beta = 0.9$, $v(c) = \log(c)$, there are two states which are iid with equal probabilities $\pi_1 = \pi_2 = 0.5$ and the firm's production function is

$$f(k, 1) = 0.9k^{0.3} + 0.3k, \quad f(k, 2) = 1.1k^{0.3} + 0.9k$$

Approximate the investment policy (as a function of capital and the shock) by a piecewise linear function, take 30 pieces (for each value of the shock) Write down the Euler equations and solve for the optimal investment policy by time iteration.

Redo the same exercise with $\beta = 0.999$ and with $v(c) = -c^{-4}$.

Try to do the same by approximating the policy function by a polynomial of degree 5 and by cubic splines.

(AR(1) shocks) Now suppose now that $f(k, 1) = \exp(A_t)k^{0.3} + 0.5k$ and that

$$A_t = 0.9A_{t-1} + \epsilon_t,$$

where ϵ_t is iid normal with standard deviation 0.1. Redo the first part of the exercise with this specification (utility is the same). Take the state space to be two-dimensional (A, k) and use tensor products.