

Assignment 2

Due: October 29th.

1. Consider an infinitely-lived representative agent economy where preferences are given by

$$U(c, l) = \frac{[c - G(l)]^{1-\gamma}}{1-\gamma},$$

where

$$G(l) = \frac{l^{1+\theta}}{1+\theta},$$

and the technology is

$$y = k^\alpha l^{1-\alpha}.$$

Capital, k , depreciates at rate δ . In the following, use $\beta = 0.96$, $\delta = 0.1$, $\theta = 0.6$, $\alpha = 0.29$ and $\gamma = 1.5$.

- (a) Solve the Bellman equation using value function iteration with Chebyshev regression.
- (b) Generate plots of the value function and the policy functions. Save them in a pdf.
2. Write a program which discretizes an AR(1) process using Gauss-Hermite quadrature. Suppose the process is

$$z' = \rho z + \varepsilon,$$

and $\varepsilon \sim N(0, \sigma^2)$. Given ρ , σ , and the number of grid points desired, the program should generate the optimal grid points and the probability transition matrix.

3. Consider again the economy of question 1. Suppose there is a technology shock, so that the production technology becomes

$$y = e^z k^\alpha n^{1-\alpha},$$

and z follows the process in 2. Discretize z using your program from 2 so that z takes two values. Compute the value function and policy functions by updating your program from 1. Pick reasonable values for ρ and σ .