FALL 2023
ECON 602
NOTE: REPORT THE PROBLEM, THE METHOD AND THE ALGORITHM THAT
YOU EMPLOY TO SOLVE THE PROBLEM, AND THE RESULTS IN A PDF FILE.
THE REPORT INCLUDING ALL THE FIGURES AND TABLES HAS TO BE TYPED
AND COMPLIED IN LATEX.

Project: Due on December 3, 2023

A social planner maximizes

$$E_t \sum_{s=0}^{\infty} \beta^t \left(\mu \ln c_t + (1-\mu) \ln (1 - l_t) \right)$$

subject to

$$c_t + \frac{\phi}{2} \left(k_{t+1} - k_t \right)^2 + k_{t+1} - (1-\delta) k_t = e^{z_t} k_t^\theta l_t^{1-\theta}$$

where z follows an AR(1) process:

$$z_t = \rho z_{t-1} + \varepsilon_t; \quad \varepsilon_t \tilde{} N \left(0, \eta^2 \right) \text{ i.i.d.}$$

Assume the following parameter values:

	Parameter values		
Preferences	$\mu = 0.34$	$\beta = 0.99$	
Technology	$\theta = 0.36$	$\delta = 0.025; \phi = 0.025$	$\rho = 0.9; \eta = 0.01$

1. Discretize the productivity process into a finite state (try 7, 11, 15) Markov chain. You will find Python codes on the Quantecon website that can be used for this purpose. Discretize the endogenous state k into finite grid points (try 100, 200, 400) and use value function iteration method to obtain value and policy functions.

2. Report the value and policy functions as 3-D graphs.

3. Numerically compute the stationary distribution of the capital stock in this economy. Display the plot of this distribution.

4. Report, in a table, the standard deviation of (1) GDP (2) Consumption (3) Investment and (4) Employment. Report the autocorrelation of output and the correlation of each of (1) consumption, (2) investment, and (4) employment with output of this economy.

5. Set $\phi = 0$. Compare the results that you obtain without adjustment costs by including them in your table above with $\phi = 0.025$. What changes and why?