

Homework 7

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Question 1

I followed the iteration method suggested by p.3 in the question sheet. The iteration converges only when I set the damping parameter $\lambda = 0.1$ or 0.2 .

Figure 1 shows firm 1's values against firm 1 and firm 2's states. The vertical axis shows the values and the horizontal axis to the left (resp. right) shows firm 1 (resp. 2)'s states.

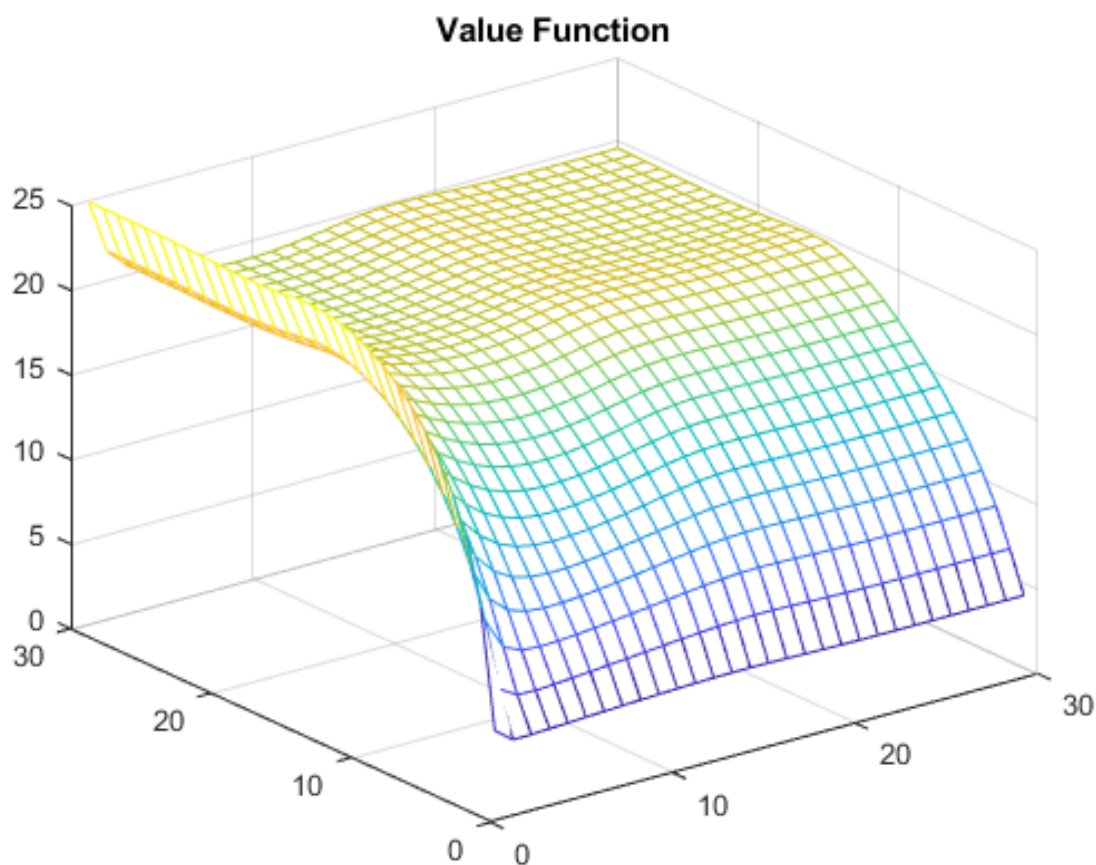


Figure 1: Value function

Figure 2 shows the policy function of firm 1. The vertical axis shows the price set by firm 1 and the horizontal axes are the same as in Figure 1.

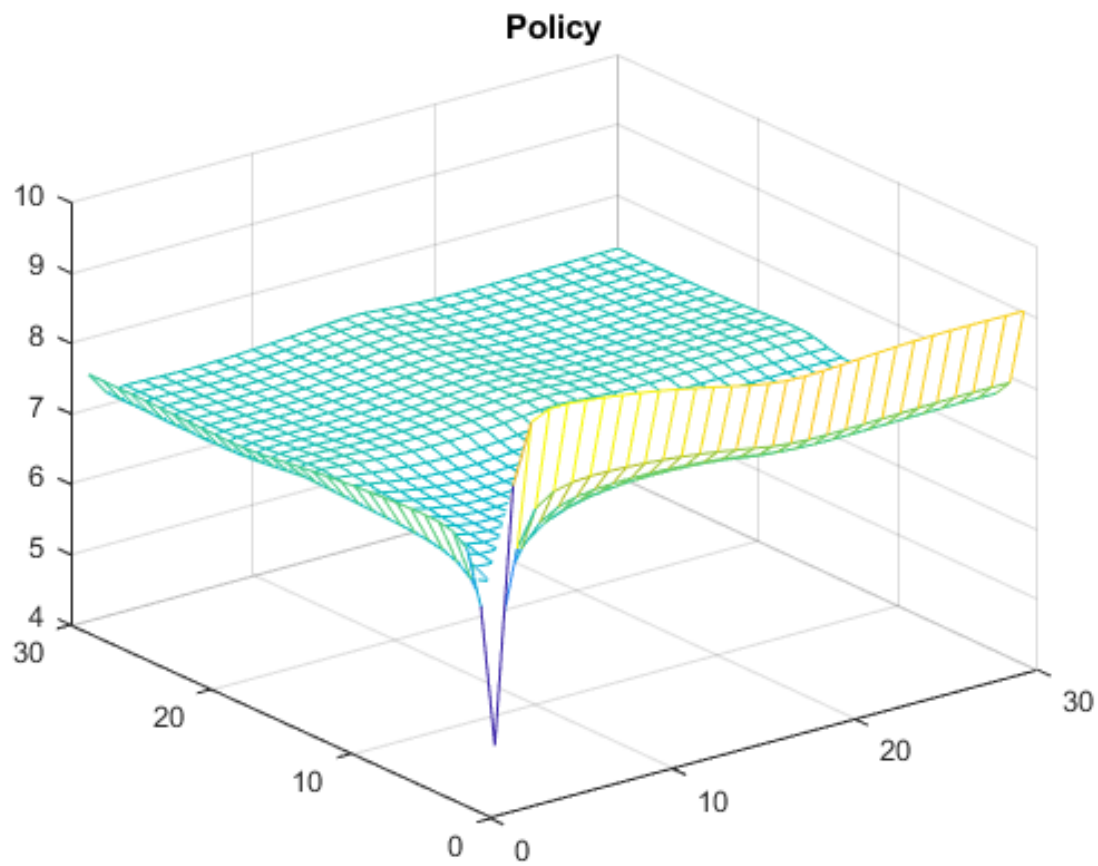


Figure 2: Policy function

Question 2

I made a 900×900 matrix that represents the transition matrix from (ω_1, ω_2) to the next period's (ω'_1, ω'_2) .

Figure 3 plots the distribution of states after 10 periods. The vertical axis shows the likelihood of the states.

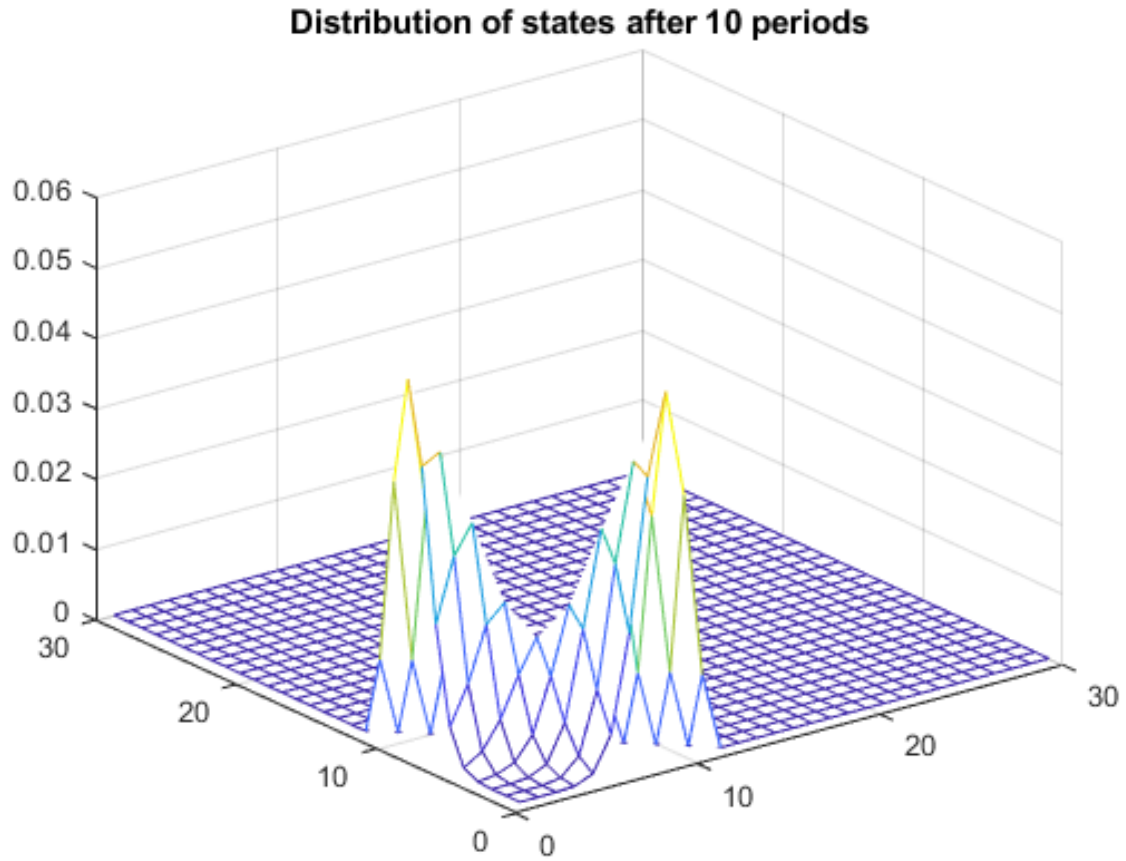


Figure 3: States after 10 periods

Figure 4 plots the distribution of states after 20 periods.

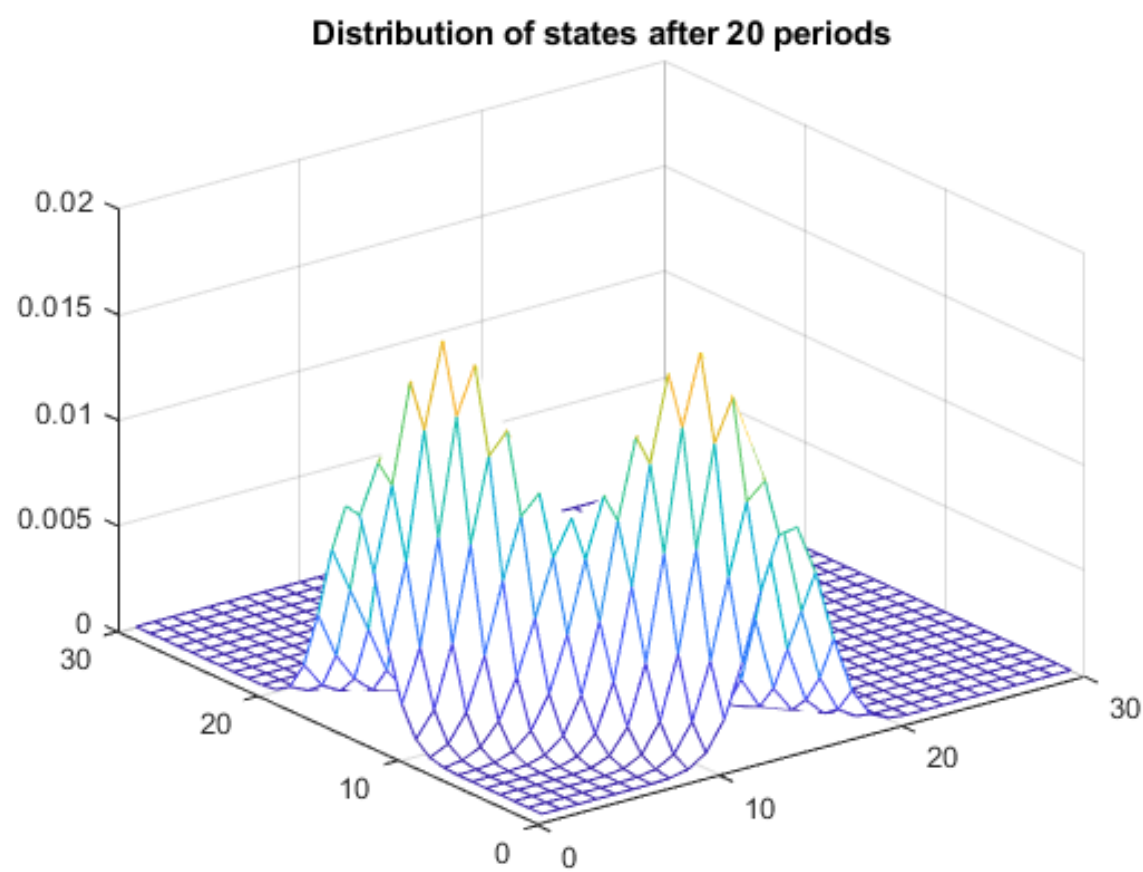


Figure 4: States after 20 periods

Figure 5 plots the distribution of states after 30 periods.

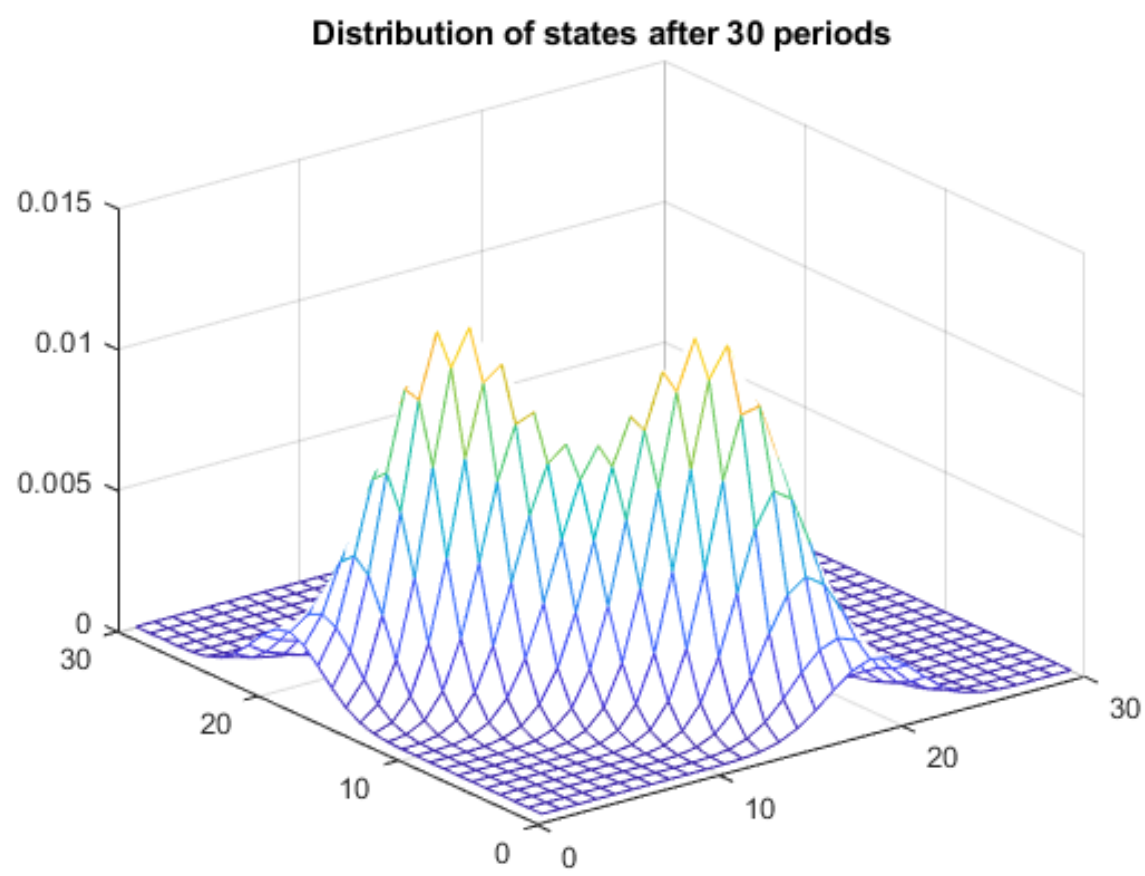


Figure 5: States after 30 periods

Question 3

I multiply the transition matrix to an arbitrary initial state vector repeatedly, until the distribution of the states converges.

Figure 6 plots the stationary distribution of the states.

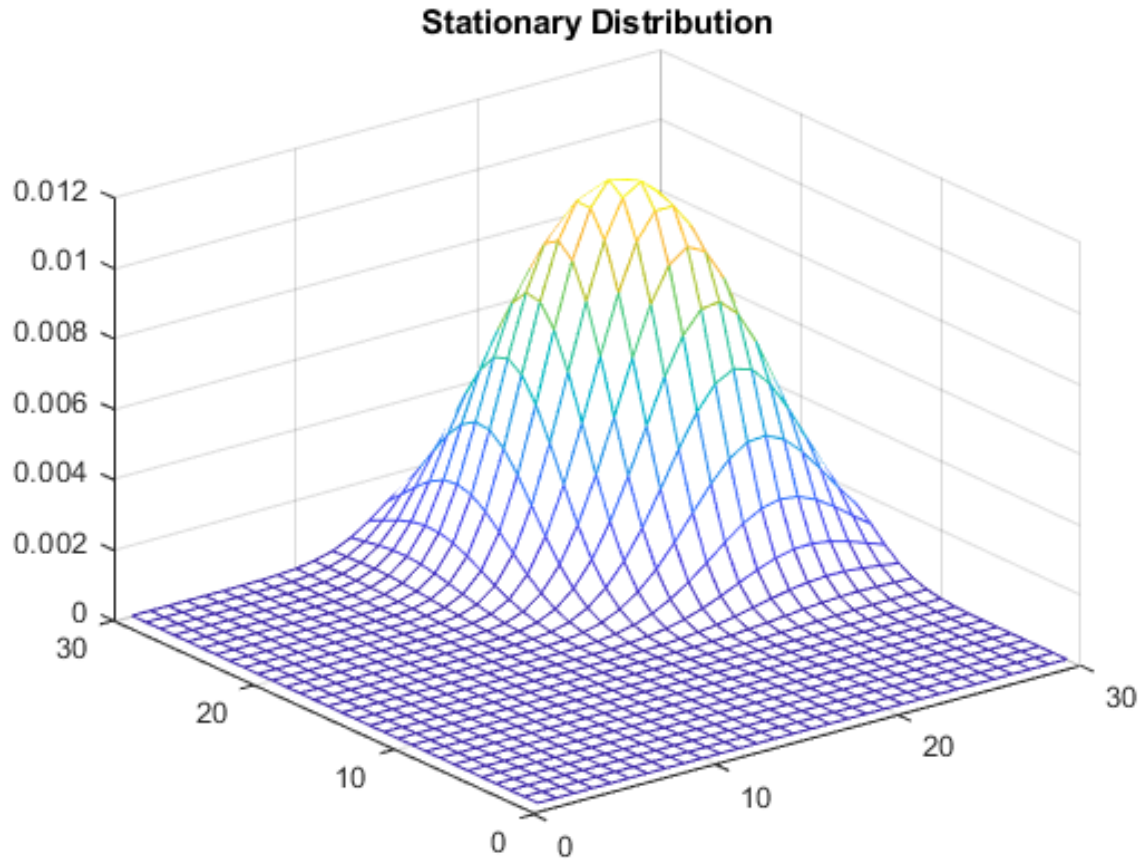


Figure 6: Stationary Distribution