

ECON 5760
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Problem Set 4

Problem 1. For this problem you will write a script called `invarmarkov.m` that iterates on the unconditional distribution $\pi'_{t+1} = \pi'_t P$ for an arbitrary Markov chain (z, P, π_0) . The code should take as inputs the transition matrix P and the initial unconditional distribution π_0 . The script should return the invariant distribution π and the transition matrix P .

Problem 2. Write a m-file called `twostatesim.m` that simulates a two-state Markov chain for the following transition matrix:

$$P = \begin{pmatrix} .50 & .50 \\ .04 & .96 \end{pmatrix} \quad (1)$$

Use the methodology as described in the write-up by Karl Sigman. The code should take as inputs the initial state s_0 , the transition matrix P , possible values for each state $z = [1, 2]'$, and the length of the simulation T .

- a. Check to see if the invariant distribution is converging to the true distribution for a large T .
- b. What size T is required to get an “accurate” approximation of the invariant distribution π ? How long does your code take to compute the invariant distribution for this T ?
- c. Now write a generalized version of your code called `markovsim.m` that simulates a Markov chain for an arbitrary P and $z = [z_1, z_2, \dots, z_m]$. Check to see if your code is working by once again calculating the invariant distribution under Monte-Carlo simulation versus iterating on the unconditional distribution.