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:

$$P = \begin{pmatrix} .50 & .50 \\ .04 & .96 \end{pmatrix} \tag{1}$$

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 $z = [z_1, z_2, ..., z_m]$. 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.