

Problems

The transition of wet and dry days in a city is modeled as a Markoff chain with 1-step transition $P_{11} = 0.8$, $P_{12} = 0.2$, $P_{21} = 0.5$, $P_{22} = 0.5$ where dry day = state 1, and wet day = state 2.

- Is the Markoff chain irreducible?
- Is the Markoff chain periodic?
- Find the stationary distribution, p_1 and p_2 , for the Markov chain.

Solution

- The Markoff chain is irreducible.
- The Markoff chain is periodic?
- From the global balance equation, we have

$$p_1 P_{12} = p_2 P_{21}.$$

We also know that

$$p_1 + p_2 = 1.$$

Thus, $p_1 = 5/7$ and $p_2 = 2/7$.