

1. Let X_0, X_1, X_2, \dots be a Markov chain with state space S . Show that for any states $i_1, i_3, i_4 \in S$,

$$\mathbf{P}(X_4 = i_4 | X_3 = i_3, X_1 = i_1) = \mathbf{P}(X_4 = i_4 | X_3 = i_3).$$