

TMA4265 Stochastic Processes

Week 37 – Exercises

1 Exercises from the book

- Chapter 3: 37, 49
- Chapter 4: 2, 3

2 Exercise 1

Consider Example 4.4 on page 185 of the book. Given it **did not rain** on Monday and Tuesday what is the probability that it rains on Thursday?

3 Exercise 2

Consider a Markov chain $\{X_n, n = 0, 1, 2, \dots\}$ with state space $\Omega = \{A, B\}$ and stationary transition matrix

$$\begin{array}{c} A \quad B \\ A \begin{pmatrix} 0.2 & 0.8 \end{pmatrix} \\ B \begin{pmatrix} 0.6 & 0.4 \end{pmatrix} \end{array}$$

The initial distribution is given by $P(X_0 = A) = 0.3$ and $P(X_0 = B) = 0.7$. Compute

- $P(X_3 = A)$
- $P(X_3 = A | X_0 = A)$
- $P(X_3 = A | X_1 = B, X_0 = A)$
- $P(X_3 = A | X_2 = B, X_1 = B, X_0 = A)$
- $P(X_6 = A | X_3 = A)$
- $P(X_3 = A | X_6 = A)$