

# MSG800/MVE170 Basic Stochastic Processes

## Exercise Session 1

### Chapter 5 in Hsu's book

**Solved problems.** Problems 5.10, 5.13, 5.21, 5.22, 5.23, 5.26 and 5.30 in Hsu's book.

**Problems** for own work. Problems 5.83, 5.84, 5.85, 5.86 and 5.89 in Hsu's book.

**Computer problem** for own work. Consider a time homogeneous Markov chain  $\{X_n\}_{n=0}^\infty$  with state space  $E$ , initial distribution  $\mathbf{p}(0)$  and transition probability matrix  $P$  given by

$$E = \{0, 1, 2\}, \quad \mathbf{p}(0) = [1 \ 0 \ 0] \quad \text{and} \quad P = \begin{bmatrix} 1/2 & 1/3 & 1/6 \\ 0 & 2/3 & 1/3 \\ 0 & 0 & 1 \end{bmatrix},$$

respectively. Find by means of computer simulations an as good as is possible for you approximation of the expected value  $E(T)$  of the time  $T = \min\{n \in \mathbb{N} : X_n = 2\}$  it takes the chain to reach the state 2.