

# MSG800/MVE170 Basic Stochastic Processes Fall 2013

## Exercise Session 3

### Sections 6.1-6.4 in G-S's book

**Solved problems.** Problems 5.30, 5.32, 5.35, 5.36 in Hsu's book.

**Problems for own work.** Problems 5.89, 5.92, 5.93 and 5.95 in Hsu's book. A many as possible of Exercises 6.1.1, 6.1.2, 6.1.4 (a), 6.1.10, 6.1.12, 6.2.1, 6.2.2, 6.2.3, 6.3.2, 6.3.3 (a), 6.3.4, 6.4.4, 6.4.6, 6.4.7 and 6.4.8 in G-S's book.

**Computer problem.** 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.