

Solutions Manual for Gregory F. Lawler's
Introduction to Stochastic Processes

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Part I

Chapter 1

Finite Markov Chains

Problem 1.1.

Problem 1.2. Consider a Markov chain with state space $0,1$ and transition matrix

$$\mathbf{P} = \begin{bmatrix} 1/3 & 2/3 \\ 3/4 & 1/4 \end{bmatrix}$$

Assuming that the chain starts in state 0 at time $n = 0$, what is the probability that it is in state 1 at time $n = 3$?

Solution. This is just some basic matrix multiplication. The chain starts in state 0 at time $n = 0$ so we will look at the first row of the matrix \mathbf{P}^3 . ◀

Problem 1.3.

Solution. ◀

Problem 1.4.

Solution. ◀

Problem 1.5.

Solution. ◀

Problem 1.6.

Solution. ◀

Problem 1.7.

Solution. ◀

Problem 1.8.

Solution. ◀

Problem 1.9.

Solution. ◀

Problem 1.10.

Solution. ◀

Problem 1.11.

Solution. ◀

Problem 1.12.

Solution. ◀

Problem 1.13.

Solution. ◀

Problem 1.14.

Solution. ◀

Problem 1.15.

Solution. ◀

Problem 1.16.

Solution. ◀

Problem 1.17.

Solution. ◀

Problem 1.18.

Solution. ◀

Problem 1.19.

Solution. ◀

Problem 1.20.

Solution. ◀

Problem 1.21.

Solution. ◀

Chapter 2

Countable Markov Chains

Problem 2.1.

Solution.



Chapter 3

Continuous-Time Markov Chains

Problem 3.1.

Solution.



Chapter 4

Optimal Stopping

Problem 4.1.

Solution.



Chapter 5

Martingales

Problem 5.1.

Solution.



Chapter 6

Renewal Processes

Problem 6.1.

Solution.



Chapter 7

Reversible Markov Chains

Problem 7.1.

Solution.



Chapter 8

Brownian Motion

Problem 8.1.

Solution.



Chapter 9

Stochastic Integration