

# Math 339SP, Fall 2025 — Homework 11

Tim Chumley

Due December 4 at 5:00 pm

**Instructions.** This problem set contains problems mostly from Week 12 of class. The problem numbers refer to our textbook, *Introduction to Stochastic Processes with R* by Robert P. Dobrow.

**Problem 1.** Please do the following textbook problems: 7.20, 7.24, 7.27, 7.30, 7.31, 7.32, 7.33, 7.34.

*Remark 1.* Each continuous-time Markov chain in this homework can be viewed as a birth-death process.

*Remark 2.* As you're working on Exercise 7.27c, you'll probably find it helpful to take a look at the discussion on page 288 about mean time until absorption in continuous time Markov chains, treating the state of Lisa having 4 fleas as an absorbing state. Alternatively, you might consider doing first-step analysis.