

STAT 575
Homework 6 Problems
due Wednesday March 10.

2 Problems to be graded. Show all work.

NOTE on the due date of HW6 (W March 10) there will be a short answer/multiple choice question given during the in-class zoom that you will answer on Blackboard as part of this HW. It will be worth 10 points (out of the 100 possible for this HW).

1. Consider the partial life table:

x	l_x
55	85,916
56	84,772
57	83,507
58	82,114

Estimate ${}_{1.4}p_{55}$ and ${}_{0.5|1.6}q_{55}$ under each of the following assumptions for non-integral ages:

- UDD
- constant force.

Hint: See Example 4.5 in the textbook.

2. Consider the critical illness model with 3 States: State 1 is healthy (H), State 2 is critically ill (C), and State 3 is dead (D). Suppose you have a homogeneous Markov Chain with transition probability matrix

$$P = \begin{bmatrix} 0.92 & 0.05 & 0.03 \\ 0.00 & 0.76 & 0.24 \\ 0.00 & 0.00 & 1.00 \end{bmatrix}$$

(a) Find P^2 and P^3 .

(b) Use the given P and your answers to (a) to find the following probabilities of being in each state at the given times.

- $P(X_1 = D | X_0 = C)$
- $P(X_2 = H | X_0 = C)$
- $P(X_2 = C | X_0 = C)$
- $P(X_3 = D | X_0 = C)$
- $P(X_1 = C | X_0 = C)$
- $P(X_2 = H | X_0 = H)$
- $P(X_2 = D | X_0 = C)$
- $P(X_3 = C | X_0 = C)$