

Pstat 172B, Spring 2008: Homework 6.

1. Do problems 10.1, 10.2, 10.4, 10.5, and 10.15 from the textbook.
2. (Spring 2005, #2, SOA) For a double-decrement model:
 - (i) ${}_t p'_{40}{}^{(1)} = 1 - \frac{t}{60}, \quad 0 \leq t \leq 60$
 - (ii) ${}_t p'_{40}{}^{(2)} = 1 - \frac{t}{40}, \quad 0 \leq t \leq 40$
 Calculate $\mu_{40}^{(\tau)}(20)$.
3. (Spring 2005, #27, SOA) (50) is an employee of XYZ Corporation. Future employment with XYZ follows a double decrement model:
 - (i) Decrement 1 is retirement.
 - (ii) $\mu_{50}^{(1)}(t) = \begin{cases} 0.00, & 0 \leq t < 5 \\ 0.02, & 5 \leq t \end{cases}$
 - (iii) Decrement 2 is leaving employment with XYZ for all other causes.
 - (iv) $\mu_{50}^{(2)}(t) = \begin{cases} 0.05, & 0 \leq t < 5 \\ 0.03, & 5 \leq t \end{cases}$
 - (v) If (50) leaves employment with XYZ, he will never rejoin XYZ.
 Calculate the probability that (50) will retire from XYZ before age 60.
4. (Fall 2006, #24, SOA) A population of 1000 lives age 60 is subject to 3 decrements, death (1), disability (2), and retirement (3). You are given:
 - (i) The following absolute rates of decrement:

x	$q'_x{}^{(1)}$	$q'_x{}^{(2)}$	$q'_x{}^{(3)}$
60	0.010	0.030	0.100
61	0.013	0.050	0.200
 - (ii) Decrements are uniformly distributed over each year of age in the multiple decrement table.
 Calculate the expected number of people who will retire before age 62.
5. (Fall 2006, #38, SOA) For a triple decrement table, you are given:
 - (i) Each decrement is uniformly distributed over each year of age in its associated single decrement table.
 - (ii) $q'_x{}^{(1)} = 0.200, q'_x{}^{(2)} = 0.080, q'_x{}^{(3)} = 0.125$
 Calculate $q_x^{(1)}$.