TA: Nhan Huynh
PSTAT 172A - Winter 2019

Review notes:
https://github.com/nhanhuynh46/Actuarial-Statistics-Winter-2019/blob/master/Pstat_172A_Insurance_section_notes_summary.pdf

HW 4 (INSURANCE)

Problem 12

A special 3-year discrete term insurance is issued to (70). The death benefit is 100 during years 1 and 2 and 200 for policy year 3. The annual effective rate is 8% and mortality rates is from ILT.
(1). Write an expression for the present value random variable Z for this policy.
(2). Calculate $E[Z]$ and $Var[Z]$.
(3). Suppose a pure endowment of 200 is added to the benefits of this policy. Comment on whether or not the variance of the present value loss random variable will increase or decrease, and why. Calculate the variance of the revised benefit to confirm your answer.

Problem 13

A life insurance policy issued at age x and with death benefit payable at the end of year of death has a death benefit of 1 in the first year and unspecified death benefits in future years. You are given:
(i). the APV at issue of of the insurance is .35 (ii). $q_x = .05$ (iii). $i = .1$
You discovered that the value of q_x was incorrect and should have been .02, but all other mortality probabilities at ages $x + 1$ and higher are unchanged. Find the corrected value of APV at issue.

Problem 11

You are given:
(i). $\bar{A}^1_{x:\overline{n}|} = .4275$ (ii). $\delta = 0.055$ (iii). $\mu_{x+t} = 0.045$. Calculate $\bar{A}_{x:\overline{n}|}$

Problem 15

Given: $\mu_{x+t} = 0.01$ for all x and t, $\delta = 0.05$, and Z is the random variable present value for a whole life insurance on (20) payable at the moment of death. Assuming the normal approximation for the random variable representing the aggregate present value, find the minimum single premium per policy to ensure that the probability is 95% that the premium will be sufficient to cover the benefits paid on a group of 100 independent whole life policies, each with face amount of $1,000 and issued simultaneously to 100 individuals all age 20. The 95th percentile of the standard normal distribution is 1.645.

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