Example 1:

Consider a $10,000$ fully discrete whole life insurance. Let π denote an annual premium for this policy and $L(\pi)$ denote the loss-at-issue random variable for one such policy on the basis of the Illustrative Life Table, 6% interest and issue age 35.

a) Determine the premium, π_a, such that the distributions of $L(\pi_a)$ has a mean 0. Calculate the variance of $L(\pi_a)$.

b) Approximate the smallest non-negative premium, π_b, such that the probability is less than 0.5 that the loss $L(\pi_b)$ is positive. Find the variance of $L(\pi_b)$.

c) Determine the premium, π_c, such that the probability of a positive total loss on 100 such independent policies is 0.05 by the normal approximation.

Example 2: LC-86

L_1 is the loss-at-issue random variable for a fully continuous whole life insurance of 1 on the life of (x) with a net level annual premium determined by the Equivalence Principle.

You are given:

(i) $\bar{a}_x = 5$

(ii) $\delta = 0.08$

(iii) $Var[L_1] = 0.5625$

L_2 is the loss-at-issue random variable for this insurance with a premium which is $4/3$ times the annual benefit premium. Calculate the sum of the expected value of L_2 and the standard deviation of L_2.

Example 3: LC-88

A fully discrete whole life insurance of 1 with a level annual premium is issued to (x). You are given:

(i) L is the loss-at-issue random variable if the premium is determined in accordance with the equivalence principle.

(ii) $Var[L] = 0.75$.

(iii) L^* is the loss-at-issue random variable if the premium is determined such that $E[L^*] = -0.5$. Calculate $Var[L^*]$.