Chapter 3 – Past Test and Quiz Problems – Random Variable L (binomial)

(5 points) There are currently 1000 independent lives all age 80 who own life insurance policies at Maxwell Life Insurance Company.

You are given that mortality for these policies follows Gompertz Law with $B = 0.000005$ and $c = 1.10$.

Let L_{90} be the random variable representing the number of lives alive at the end of 10 years.

Calculate the $Var(L_{90})$.

Solutions:

$L_{90} \sim Bin(1000,{}_{10}p_{80})$

$${}_{10}p_{80} = e^{-\frac{-0.000005}{\ln(1.1)}(1.1)^{80}(1.1^{10}-1)} = 0.8426$$

$$Var[L_{90}] = npq = 1000(0.8426)(1-0.8426) = 132.6253$$