

MATH 3630 - Actuarial Mathematics I

Fall 2017 - Valdez

Quiz No. 3

Wednesday, 11 October 2017

Name: EMIL

Student ID: Suggested Solution

For a life insurance on (x) with benefits payable at the moment of death, you are given:

$$\mu_{x+t} = \begin{cases} 0.01, & 0 < t \leq 15 \\ 0.02, & t > 15 \end{cases}$$

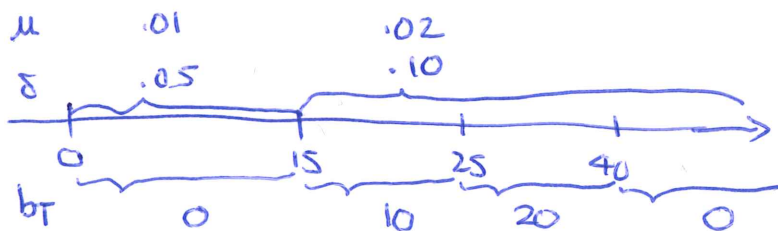
and

$$\delta_t = \begin{cases} 0.05, & 0 < t \leq 15 \\ 0.10, & t > 15 \end{cases}$$

Let T be the future lifetime random variable of (x) . The present value random variable is given by

$$Z = \begin{cases} 0, & \text{for } 0 < T \leq 15 \\ 10v^T, & \text{for } 15 < T \leq 25 \\ 20v^T, & \text{for } 25 < T \leq 40 \\ 0, & \text{for } T > 40 \end{cases}$$

Calculate $E[Z]$.



$$E[Z] = e^{-.06(15)} \left[10 \times \frac{.02}{.12} (1 - e^{-.12(10)}) + 20 \times \frac{.02}{.12} (1 - e^{-.12(15)}) \cdot e^{-.12(10)} \right]$$

$$= e^{-.9} \left[\frac{5}{3} (1 - e^{-1.2}) + \frac{10}{3} e^{-1.2} (1 - e^{-1.8}) \right]$$

$$= \underline{\underline{0.8142371}}$$