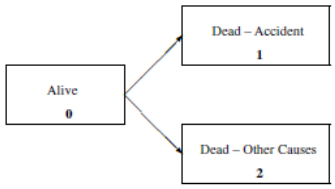
MTH5125 Assessment 2

Deadline: April 11 at 5:00PM on QMPlus
Please submit two files

- one Excel file
- one written file with your detailed answers.

1. Consider the accidental death model illustrated below.



Let $\mu_x^{01} = 10^{-5}$ and $\mu_x^{02} = A + Bc^x$ for all x where $A = 5 \times 10^{-4}, B = 7.4 \times 10^{-5}$ and $c = 1.05$.

Let $\tau = \max(5,$ the last digit of your student number $)$. For example if your student number is 210473641 then $\tau = 5$.

Calculate:

(i) ${}_\tau p_{35}^{00}$ **[15 marks]**

(ii) ${}_\tau p_{35}^{02}$ **[15 marks]**

(iii)${}_\tau p_{35}^{01}$ **[10 marks]**

Q1: 40 marks

2. An insurance company uses the model above to calculate premiums for a special τ-year term life insurance policy. The basic sum insured is $\$100,000$, but the death benefit is $\$150,000$ if death occurs as a result of an accident. The death benefit is payable immediately on death. Premiums are payable continuously throughout the term. The effective rate of interest is 3% per year and there are no expenses. The policy is issued to a life aged 35.

(i) calculate the annual premium for this policy **[20 marks]**

(ii) calculate the policy value at time $1, 2, \tau - 2, \tau - 1$ and τ in state 0 **[25 marks]**

(iii) comment on the results at (ii) **[15 marks]**

Q2: 60 marks