Life insurance models

List 6.

1. Consider a 5−years deferred whole life insurance payable at the moment of death of (x). The individual is subject to a constant force of mortality $\mu = 0.04$. For the distribution of the present value of the benefit payment, at $\delta = 0.1$, calculate expectation and variance.

2. Assuming de Moivre's survival function with $\omega = 100$ and $i = 0.1$ calculate
   a) $\overline{A}^{1}_{30:\overline{10}|}$
   b) the variance of the present value, at policy issue, of the benefit of the insurance in a).
3. Let $l_x = 110 - x$ for $0 \leqslant x \leqslant 110$ and $\delta = 0.05$. Calculate whole life continuous annuity for (20) and 5−years temporary life continuous annuity for (30).

4. Calculate variance of a random variable $\bar{a}_{\overline{T}|}$ $(T = T(x))$ under the assumption $\sigma > 0$ and

$$\bar{a}_x = 9, \ \frac{{}^2\bar{A}_x}{\bar{A}} = \frac{2}{3}, \ \ \frac{1 - {}^2\bar{A}_x}{2\sigma} = 6.$$

5. Under the assumptions of a constant force of mortality, $\mu = 0.04$, and of a constant force of interest, $\delta = 0.06$ evaluate $\overline{a}_x$ and $\overline{A}_x$.

6. Let $\delta = 0.05$. Calculate for male aged (20) the 4−year temporary life annuity of 10 per annum payable at the beginning of each year and the 3−year temporary life annuity of 5 per annum payable at the end of each year. Use life table parameters.