ACTEX LTAM Study Manual

Fall 2019 Edition

Errata

Apr 14, 2020

C5-11, Example 5.5 Solution: change as follows:

Under UDD,

$$A^{(4)\,1}_{50:\overline{20|}} = \frac{i}{i^{(4)}} A^{\,1}_{50:\overline{20|}} = 1.01856(0.38844 - 0.34824) = 0.040946$$

$$A^{(4)}_{50:\overline{20|}} = A^{(4)\,1}_{50:\overline{20|}} + {}_{20}E_{50} = 0.040946 + 0.34824 = 0.389186$$

$$\ddot{a}^{(4)}_{50:\overline{10|}} = \alpha(4)\ddot{a}^{(4)}_{50:\overline{10|}} - \beta(4)(1 - {}_{10}E_{50}) = 1.00019 \times 8.0550 - 0.38272(1 - 0.60182) = 7.904139$$

The annual premium is 5000(0.389186) / 7.904139 = 246.1913.

This means that each quarterly premium is 246.1913 / 4 = 64.548.

C5-44 16: add (vi) $A_{80} = 0.54092$

C5-61 and C5-62 16: change 592.93 to 540.92, and the final answer to 800.85.

C5-70 solution to Ex 34, line 3 and 4:

…and hence $k = 58$. The percentile premium is $\dfrac{10000}{\ddot{s}_{\overline{59|}}} = \dfrac{10000 \times 0.05/1.05}{1.05^{59} - 1} = 28.36.$

C7-22 solution: line7: $q_{44} = 0.000710$. The RHS of the above is 9.623667…

line 8: ${}_9V = 8.003842$

last line for (a): ${}_9V^{\text{mod}} = 8.12.$

C7-63 solution 30(b): Change $A_{x+t:\overline{h-t|}}$ to $A_{x+t:\overline{n-t|}}$

C10-44 line −2: change 6.292526 to 4.89253

C10-78 #20(b) $\dfrac{d}{dt}\,{}_tp_x^{02} = {}_tp_x^{00}\mu_{x+t}^{02} + {}_tp_x^{01}\mu_{x+t}^{12}$

C12-75 9 Starting from line 3 of the expression at the middle: … = $8.380037S$

last 2 lines: $\dfrac{8.380037S}{13.5498} = 0.618462S$ … So the ratio is $0.618462 / 1.03^{34} = 22.64\%$

C12-78 12(b) The benefit related to past service is the accrual rate multiplied with the total salary earned from May 1, 2012 to April 30, 2022:

$$2.5\%(40000 + 40000 \times 1.035 + \ldots + 40000 \times 1.035^9) = 0.025 \times 40000 \times \frac{1.035^{10} - 1}{0.035} = 11731.39$$

The benefit related to future services is 66674.013 – 11731.39 = 54942.62.

C15-26, line -5: E[logit($q(x, t+1)$)] = … = $c^{(1)} + K_t^{(1)} + (c^{(2)} + K_t^{(2)})(x - \bar{x})$

line -2: $\sigma_{K_1}^2 + (x - \bar{x})^2\sigma_{K_2}^2 + 2(x - \bar{x})\rho\sigma_{K_1}\sigma_{K_2}$

Apply the same change to line 3 and line 6 of the solution on C15-27, and to solutions of #38 and #39 on C15-45.

C15-28, equation box: change the second $K_t^{(2)}$ to $K_t^{(3)}$

Apply the same change to C15-37 #43 and the solution to #43 (last line) on C15-46.

C16-28, #5: Change 4000 to 40,000

C16-39, solution to #4 line 6: $\ddot{a}_x^{11} = \sum_{k=0}^{\infty} v^k {}_k p_x^{11} = p_x^{11} + \sum_{k=1}^{\infty} v^k {}_k p_x^{11} = 1 + a_x^{11}$

T1-5 7 Change the first three options as (A) 53% (B) 63% (C) 73%

T1-18 Change the option of 7 from B to C (do the same T1-19 Q7)

T1-20 line 1: $\dfrac{61.436416S}{13.5498-1} = 4.89541S$ line 3: So the ratio is $4.89541 / 1.05^{39} = 73.01\%$.