★★★★★

Three formulas for ${}_{t|u}q_x$ *in terms of non-deferred p's and q's*

1F

Survival Distributions ★★★★★

$$
{}_{t|u}q_x = {}_tp_x \, {}_uq_{x+t}
$$

$$
{}_{t|u}q_x = {}_tp_x - {}_{t+u}p_x
$$

$$
{}_{t|u}q_x = {}_{t+u}q_x - {}_tq_x
$$

Lesson 2, page 27, Table 2.1 1B

★★★★★

${}_{k}p_{x}$ *in terms of l's*

2F

Survival Distributions ★★★★★

$$ {}_k p_x = \frac{l_{x+k}}{l_x} $$

Lesson 2, page 27, Table 2.1 2B

★★★★★

${}_{k}q_{x}$ *in terms of l's and d's*

3F

Survival Distributions ★★★★★

$$ {}_kq_x = \frac{{}_kd_x}{l_x} = \frac{l_x - l_{x+k}}{l_x} $$

Lesson 2, page 27, Table 2.1 3B

★★★

$_{t|u}q_x$ *in terms of l's and d's*

4F

$$
{}_{t|u}q_x = \frac{{}_u d_x}{l_x} = \frac{l_{x+t} - l_{x+t+u}}{l_x}
$$

★★★★

Definition of $_tq_x$ in terms of probabilities of X, the random variable for age at death.

5F

$$ {}_tq_x = \Pr(x < X \leq x + t \mid X > x) $$

★★★★★

$_sq_x$ *under UDD,* $s \leq 1$

71F

$$ {}_sq_x = s\,q_x $$

★★★★★

$_s p_x$ *under UDD,* $s \leq 1$

72F

$${}_s p_x = 1 - {}_s q_x$$

★★★★★

l_{x+s} *under UDD,* $s \leq 1$

Survival Distributions ★★★★★

$$l_{x+s} = l_x - s\,d_x$$

Lesson 7, page 123, formula (7.1) 73B

★★★★

${}_{1-s}q_{x+s}$ *under UDD,* $s \leq 1$

74F

$$ {}_{1-s}q_{x+s} = \frac{(1-s)q_x}{1-sq_x} $$

★★★

$_{s}q_{x+t}$ *under UDD,* $s+t \leq 1$

$$ {}_{s}q_{x+t} = \frac{{}_{s+t}q_x - {}_{t}q_x}{1 - {}_{t}q_x} $$

★★★★

μ_{x+s} *under UDD,* $s \leq 1$

76F

$$\mu_{x+s} = \frac{q_x}{1 - s q_x}$$

★★★★

$_{s}p_{x}\,\mu_{x+s}$ *under UDD,* $s \leq 1$

77F

$${}_s p_x \, \mu_{x+s} = q_x$$

★★★★

$q_x^{(1)}$ in terms of $q_x'^{(1)}$ and $q_x'^{(2)}$ when there are only two decrements and both are uniformly distributed in the associated single-decrement tables

379F

$$q_x^{(1)} = q_x'^{(1)}\left(1 - \frac{q_x'^{(2)}}{2}\right)$$

★★★

$q_x^{(1)}$ in terms of $q_x'^{(1)}$, $q_x'^{(2)}$, and $q_x'^{(3)}$ when there are only three decrements and they are uniformly distributed in the associated single-decrement tables

380F

$$q_x^{(1)} = q_x'^{(1)}\left(1 - \frac{q_x'^{(2)} + q_x'^{(3)}}{2} + \frac{q_x'^{(2)}q_x'^{(3)}}{3}\right)$$

★★

${}_{t|s}q_x^{(1)}$, $t + s \leq 1$, in terms of $q_x'^{(1)}$, $q_x'^{(2)}$, and $q_x'^{(3)}$ when there are only three decrements and they are uniformly distributed in the associated single-decrement tables

$$
{}_{t|s}q_x^{(1)} = q_x'^{(1)}\left(s - \frac{(t+s)^2 - t^2}{2}\left(q_x'^{(2)} + q_x'^{(3)}\right) + \frac{(t+s)^3 - t^3}{3}\left(q_x'^{(2)} q_x'^{(3)}\right)\right)
$$

★★

If there are two decrements, with (1) discrete at time $0 \leq a \leq 1$, *and (2) uniformly distributed over* $(0, 1]$ *in the associated single decrement table, what are* $q_x^{(1)}$ *and* $q_x^{(2)}$ *in terms of* $q_x^{\prime(1)}$ *and* $q_x^{\prime(2)}$*?*

382F

$$q_x^{(1)} = q_x'^{(1)}\left(1 - a q_x'^{(2)}\right)$$
$$q_x^{(2)} = q_x'^{(2)}\left(a + (1-a)(1 - q_x'^{(1)})\right)$$

★

If there are three decrements, with (1) discrete at time $0 \leq a \leq 1$*, and (2),(3) uniformly distributed in the associated single-decrement tables, what are* $q_x^{(1)}$*,* $q_x^{(2)}$*, and* $q_x^{(3)}$ *in terms of* $q_x'^{(1)}$*,* $q_x'^{(2)}$*, and* $q_x'^{(3)}$*?*

383F

$$q_x^{(1)} = q_x'^{(1)}(1 - a q_x'^{(2)})(1 - a q_x'^{(3)})$$
$$q_x^{(2)} = q_x'^{(2)}\Big(a(1 - 0.5a q_x'^{(3)}) + (1 - a)(1 - q_x'^{(1)})(1 - 0.5(1 + a)q_x'^{(3)})\Big)$$
$$q_x^{(3)} = q_x'^{(3)}\Big(a(1 - 0.5a q_x'^{(2)}) + (1 - a)(1 - q_x'^{(1)})(1 - 0.5(1 + a)q_x'^{(2)})\Big)$$