

Solution # 233

2 lives age x iid mortality
 10,000 if both alive, 2,000 if exactly one

$$\Rightarrow 2000 \ddot{a}_{x:\overline{3}|} + 2000 \ddot{a}_{x:\overline{3}|} + 6000 \ddot{a}_{xx:\overline{3}|}$$

$$\ddot{a}_{x:\overline{3}|} = 1 + v p_x + v^2 p_x p_{x+1}$$

$$\ddot{a}_{xx:\overline{3}|} = 1 + v p_{xx} + v^2 p_{xx} p_{x+1:x+1}$$

q_{xx} = probability at least one dies

$1 - q_{xx} = p_{xx}$ = probability both live

~~1 - .04 = .96~~ 2 lives $\Rightarrow p_{xx} = p_x \cdot p_x$

$$1 - .04 = .96 \quad p_x = \sqrt{p_{xx}} \quad p_x = \sqrt{.96} = .9798$$

$$1 - q_{x+1:x+1} = p_{x+1:x+1} \quad 1 - .01 = .99$$

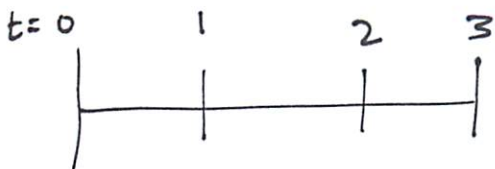
$$p_{x+1} = \sqrt{p_{x+1:x+1}} = \sqrt{.99} = .995$$

$$\ddot{a}_{x:\overline{3}|} = 1 + (v/1.05)(.9798) + (v/1.05)^2 (.9798)(.995) = 2.817$$

$$\ddot{a}_{xx:\overline{3}|} = 1 + (v/1.05)(.96) + (v/1.05)^2 (.96)(.99) = 2.776$$

$$2000(2.817) + 2000(2.817) + 6000(2.776)$$

$$= 27,925.95$$



B

$$\ddot{a}_{x:\overline{3}|} =$$

$$\ddot{a}_{xx:\overline{3}|} =$$

$$i = 5\%$$

$$q_{xx} = .04$$

$$q_{x+1:x+1} = .01$$

$$p_{xx} = .96$$

$$p_{x+1:x+1} = .99$$

$$\rightarrow p_x = .9798$$

$$p_{x+1} = .995$$