Seminari 14

Matematika za ekonomiste 2

Damir Horvat

FOI, Varaždin

Sadržaj

Teorija

Oznake

- $D_x \rightarrow$ diskontirani broj živih osoba starosti x

$$D_x = \ell_x \cdot v^x, \qquad v = \frac{1}{r}$$

- $N_x \rightarrow$ zbroj diskontiranih živih osoba starijih od x godina

$$N_x = D_x + D_{x+1} + \cdots + D_\omega$$

- $C_x \rightarrow$ diskontirani broj umrlih osoba starosti x

$$C_x = d_x \cdot v^{x+1}$$

- $M_x \rightarrow$ zbroj diskontiranih umrlih osoba starijih od x godina

$$M_x = C_x + C_{x+1} + \cdots + C_\omega$$

Princip ekvivalencije

- **Premija** $\rightarrow$ uplata osiguranika (kotizacija)
- **Princip ekvivalencije**

  Sadašnja vrijednost matematički očekivanih uplata mora biti jednaka sadašnjoj vrijednosti matematički očekivanih isplata.
- **premija** $=$ **osigurana svota** $\cdot$ **koeficijent**

  Kod različitih vrsta osiguranja koeficijent se računa po drukčijoj formuli i ima drukčiju oznaku.

$$\mathbf{B} = \mathbf{S} \cdot \text{koeficijent}$$

Premije u osiguranju života

Poopćenje osobnih renti (periodskih isplata)

- Neodgođena doživotna osobna renta
- Neodgođena osobna renta trajanja n godina
- Za n godina odgođena doživotna renta (starosna renta)

Nekoliko posebnih vrsta osiguranja

- Osiguranje za slučaj doživljenja
- Osiguranje za slučaj smrti
  - Doživotno osiguranje za slučaj smrti
  - Privremeno osiguranje za slučaj smrti
- Mješovito osiguranje

Neodgođena doživotna osobna renta

- Nakon uplate premije osiguraniku se doživotno isplaćuje renta

$$\ddot{a}_x = 1 + \frac{D_{x+1}}{D_x} + \frac{D_{x+2}}{D_x} + \cdots + \frac{D_\omega}{D_x} = \frac{N_x}{D_x}$$

$$B = S \cdot \ddot{a}_x$$

Neodgođena osobna renta trajanja n godina

- Nakon uplate premije osiguraniku se n godina isplaćuje renta

$$\ddot{a}_{x:n\rceil} = 1 + \frac{D_{x+1}}{D_x} + \frac{D_{x+2}}{D_x} + \cdots + \frac{D_{x+n-1}}{D_x} = \frac{N_x - N_{x+n}}{D_x}$$

$$B = S \cdot \ddot{a}_{x:n\rceil}$$

Za n godina odgođena doživotna renta (starosna renta)

- Nakon uplate premije osiguraniku se doživotno isplaćuje renta tek nakon isteka n godina

$$ {}_{n|}\ddot{a}_x = \frac{D_{x+n}}{D_x} + \frac{D_{x+n+1}}{D_x} + \cdots + \frac{D_\omega}{D_x} = \frac{N_{x+n}}{D_x} $$

$$ B = S \cdot {}_{n|}\ddot{a}_x $$

Osiguranje za slučaj doživljenja

- Nakon uplate premije osiguraniku se nakon n godina isplaćuje osigurana svota.

$$ {}_nE_x = \frac{D_{x+n}}{D_x}, \qquad B = S \cdot {}_nE_x $$

Doživotno osiguranje za slučaj smrti

- Nakon uplate premije osiguranikovoj se obitelji nakon njegove smrti isplaćuje osigurana svota

$$A_x = \frac{C_x}{D_x} + \frac{C_{x+1}}{D_x} + \cdots + \frac{C_\omega}{D_x} = \frac{M_x}{D_x}$$

$$B = S \cdot A_x$$

Privremeno osiguranje za slučaj smrti s trajanjem n godina

- Nakon uplate premije, u slučaju smrti osiguranika u idućih n godina, osiguranikovoj se obitelji isplaćuje osigurana svota

$${}_{|n}A_x = \frac{C_x}{D_x} + \frac{C_{x+1}}{D_x} + \cdots + \frac{C_{x+n-1}}{D_x} = \frac{M_x - M_{x+n}}{D_x}$$

$$B = S \cdot {}_{|n}A_x$$

Mješovito osiguranje

- osiguranje za slučaj doživljenja + osiguranje za slučaj smrti

Jednokratna uplata

$$A_{x:n\rceil} = {}_nE_x + {}_{|n}A_x = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

$$B = S \cdot A_{x:n\rceil}$$

Godišnja uplata

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}}$$

Dostatna premija mješovitog osiguranja – uključuje troškove

- troškovi zaključenja (akvizicijski) – jednokratni
  – stopa troškova α
- inkaso troškovi – troškovi prikupljanja premija
  – stopa troškova β
- upravni troškovi – stopa troškova γ

Jednokratna uplata

$$A^a_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{1-\beta}, \qquad B = S \cdot A^a_{x:n\rceil}$$

Godišnja uplata

$$P^a_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta)\cdot \ddot{a}_{x:n\rceil}}, \qquad B = S \cdot P^a_{x:n\rceil}$$

prvi zadatak

Zadatak 1

Koliku jednokratnu premiju mora uplatiti osiguranik starosti 40 *godina kako bi nakon navršene* 65 *godine raspolagao osiguranom svotom visine* 8000 €*?*

$$B = S \cdot {}_nE_x$$

$${}_nE_x = \frac{D_{x+n}}{D_x}$$

Zadatak 1

Koliku jednokratnu premiju mora uplatiti osiguranik starosti 40 *godina kako bi nakon navršene* 65 *godine raspolagao osiguranom svotom visine* 8000 €*?*

Rješenje

$${}_{25}E_{40} = \frac{D_{65}(m)}{D_{40}(m)} =$$

$$B = S \cdot {}_nE_x$$

$${}_nE_x = \frac{D_{x+n}}{D_x}$$

Zadatak 1

Koliku jednokratnu premiju mora uplatiti osiguranik starosti 40 *godina kako bi nakon navršene* 65 *godine raspolagao osiguranom svotom visine* 8000 €*?*

Rješenje

$${}_{25}E_{40} = \frac{D_{65}(m)}{D_{40}(m)} = \text{\_\_\_\_\_}$$

$$B = S \cdot {}_nE_x$$

$${}_nE_x = \frac{D_{x+n}}{D_x}$$

Zadatak 1

Koliku jednokratnu premiju mora uplatiti osiguranik starosti 40 *godina kako bi nakon navršene* 65 *godine raspolagao osiguranom svotom visine* 8000 €*?*

Rješenje

$${}_{25}E_{40} = \frac{D_{65}(m)}{D_{40}(m)} = \frac{8322.27}{}$$

$$B = S \cdot {}_nE_x$$

$${}_nE_x = \frac{D_{x+n}}{D_x}$$

Zadatak 1

Koliku jednokratnu premiju mora uplatiti osiguranik starosti 40 *godina kako bi nakon navršene* 65 *godine raspolagao osiguranom svotom visine* 8000 €*?*

Rješenje

$${}_{25}E_{40} = \frac{D_{65}(m)}{D_{40}(m)} = \frac{8322.27}{24\,594.50}$$

$$B = S \cdot {}_nE_x$$

$${}_nE_x = \frac{D_{x+n}}{D_x}$$

Zadatak 1

Koliku jednokratnu premiju mora uplatiti osiguranik starosti 40 *godina kako bi nakon navršene* 65 *godine raspolagao osiguranom svotom visine* 8000 €*?*

Rješenje

$${}_{25}E_{40} = \frac{D_{65}(m)}{D_{40}(m)} = \frac{8322.27}{24\,594.50} = 0.338379$$

$$B = S \cdot {}_nE_x$$

$${}_nE_x = \frac{D_{x+n}}{D_x}$$

Zadatak 1

Koliku jednokratnu premiju mora uplatiti osiguranik starosti 40 *godina kako bi nakon navršene* 65 *godine raspolagao osiguranom svotom visine* 8000 €*?*

Rješenje

$${}_{25}E_{40} = \frac{D_{65}(m)}{D_{40}(m)} = \frac{8322.27}{24\,594.50} = 0.338379$$

$$B = S \cdot {}_{25}E_{40} =$$

$$B = S \cdot {}_nE_x$$

$${}_nE_x = \frac{D_{x+n}}{D_x}$$

Zadatak 1

Koliku jednokratnu premiju mora uplatiti osiguranik starosti 40 *godina kako bi nakon navršene* 65 *godine raspolagao osiguranom svotom visine* 8000 €*?*

Rješenje

$${}_{25}E_{40} = \frac{D_{65}(m)}{D_{40}(m)} = \frac{8322.27}{24\,594.50} = 0.338379$$

$$B = S \cdot {}_{25}E_{40} = 8000$$

$$B = S \cdot {}_nE_x$$

$${}_nE_x = \frac{D_{x+n}}{D_x}$$

Zadatak 1

Koliku jednokratnu premiju mora uplatiti osiguranik starosti 40 *godina kako bi nakon navršene* 65 *godine raspolagao osiguranom svotom visine* 8000 €*?*

Rješenje

$${}_{25}E_{40} = \frac{D_{65}(m)}{D_{40}(m)} = \frac{8322.27}{24\,594.50} = 0.338379$$

$$B = S \cdot {}_{25}E_{40} = 8000 \cdot 0.338379$$

$$B = S \cdot {}_nE_x$$

$${}_nE_x = \frac{D_{x+n}}{D_x}$$

Zadatak 1

Koliku jednokratnu premiju mora uplatiti osiguranik starosti 40 *godina kako bi nakon navršene* 65 *godine raspolagao osiguranom svotom visine* 8000 €*?*

Rješenje

$${}_{25}E_{40} = \frac{D_{65}(m)}{D_{40}(m)} = \frac{8322.27}{24\,594.50} = 0.338379$$

$$B = S \cdot {}_{25}E_{40} = 8000 \cdot 0.338379 = 2707.03$$

$$B = S \cdot {}_nE_x$$

$${}_nE_x = \frac{D_{x+n}}{D_x}$$

Zadatak 1

Koliku jednokratnu premiju mora uplatiti osiguranik starosti 40 *godina kako bi nakon navršene* 65 *godine raspolagao osiguranom svotom visine* 8000 €*?*

Rješenje

$${}_{25}E_{40} = \frac{D_{65}(m)}{D_{40}(m)} = \frac{8322.27}{24\,594.50} = 0.338379$$

$$B = S \cdot {}_{25}E_{40} = 8000 \cdot 0.338379 = 2707.03$$

Osiguranik mora uplatiti jednokratnu premiju visine 2707.03 €.

drugi zadatak

Zadatak 2

Koliku jednokratnu premiju mora uplatiti osiguranica starosti 50 *godina kako bi u slučaju njezine smrti osiguravajuće društvo njezinoj obitelji isplatilo* 20 000 €*?*

$$B = S \cdot A_x$$

$$A_x = \frac{M_x}{D_x}$$

Zadatak 2

Koliku jednokratnu premiju mora uplatiti osiguranica starosti 50 *godina kako bi u slučaju njezine smrti osiguravajuće društvo njezinoj obitelji isplatilo* 20 000 €*?*

Rješenje

$$A_{50} = \frac{M_{50}(f)}{D_{50}(f)} =$$

$$B = S \cdot A_x$$

$$A_x = \frac{M_x}{D_x}$$

Zadatak 2

Koliku jednokratnu premiju mora uplatiti osiguranica starosti 50 *godina kako bi u slučaju njezine smrti osiguravajuće društvo njezinoj obitelji isplatilo* 20 000 €*?*

Rješenje

$$A_{50} = \frac{M_{50}(f)}{D_{50}(f)} = \text{\_\_\_\_\_}$$

$$B = S \cdot A_x$$

$$A_x = \frac{M_x}{D_x}$$

Zadatak 2

Koliku jednokratnu premiju mora uplatiti osiguranica starosti 50 *godina kako bi u slučaju njezine smrti osiguravajuće društvo njezinoj obitelji isplatilo* 20 000 €*?*

Rješenje

$$A_{50} = \frac{M_{50}(f)}{D_{50}(f)} = \frac{6146.51}{}$$

$$B = S \cdot A_x$$

$$A_x = \frac{M_x}{D_x}$$

Zadatak 2

Koliku jednokratnu premiju mora uplatiti osiguranica starosti 50 *godina kako bi u slučaju njezine smrti osiguravajuće društvo njezinoj obitelji isplatilo* 20 000 €*?*

Rješenje

$$A_{50} = \frac{M_{50}(f)}{D_{50}(f)} = \frac{6146.51}{17\,434.07}$$

$$B = S \cdot A_x$$

$$A_x = \frac{M_x}{D_x}$$

Zadatak 2

Koliku jednokratnu premiju mora uplatiti osiguranica starosti 50 *godina kako bi u slučaju njezine smrti osiguravajuće društvo njezinoj obitelji isplatilo* 20 000 €*?*

Rješenje

$$A_{50} = \frac{M_{50}(f)}{D_{50}(f)} = \frac{6146.51}{17\,434.07} = 0.352557$$

$$B = S \cdot A_x$$

$$A_x = \frac{M_x}{D_x}$$

Zadatak 2

Koliku jednokratnu premiju mora uplatiti osiguranica starosti 50 *godina kako bi u slučaju njezine smrti osiguravajuće društvo njezinoj obitelji isplatilo* 20 000 €*?*

Rješenje

$$A_{50} = \frac{M_{50}(f)}{D_{50}(f)} = \frac{6146.51}{17\,434.07} = 0.352557$$

$$B = S \cdot A_{50} =$$

$$B = S \cdot A_x$$

$$A_x = \frac{M_x}{D_x}$$

Zadatak 2

Koliku jednokratnu premiju mora uplatiti osiguranica starosti 50 *godina kako bi u slučaju njezine smrti osiguravajuće društvo njezinoj obitelji isplatilo* 20 000 €*?*

Rješenje

$$A_{50} = \frac{M_{50}(f)}{D_{50}(f)} = \frac{6146.51}{17\,434.07} = 0.352557$$

$$B = S \cdot A_{50} = 20\,000$$

$$B = S \cdot A_x$$

$$A_x = \frac{M_x}{D_x}$$

Zadatak 2

Koliku jednokratnu premiju mora uplatiti osiguranica starosti 50 *godina kako bi u slučaju njezine smrti osiguravajuće društvo njezinoj obitelji isplatilo* 20 000 €*?*

Rješenje

$$A_{50} = \frac{M_{50}(f)}{D_{50}(f)} = \frac{6146.51}{17\,434.07} = 0.352557$$

$$B = S \cdot A_{50} = 20\,000 \cdot 0.352557$$

$$B = S \cdot A_x$$

$$A_x = \frac{M_x}{D_x}$$

Zadatak 2

Koliku jednokratnu premiju mora uplatiti osiguranica starosti 50 *godina kako bi u slučaju njezine smrti osiguravajuće društvo njezinoj obitelji isplatilo* 20 000 €*?*

Rješenje

$$A_{50} = \frac{M_{50}(f)}{D_{50}(f)} = \frac{6146.51}{17\,434.07} = 0.352557$$

$$B = S \cdot A_{50} = 20\,000 \cdot 0.352557 = 7051.14$$

$$B = S \cdot A_x$$

$$A_x = \frac{M_x}{D_x}$$

Zadatak 2

Koliku jednokratnu premiju mora uplatiti osiguranica starosti 50 *godina kako bi u slučaju njezine smrti osiguravajuće društvo njezinoj obitelji isplatilo* 20 000 €*?*

Rješenje

$$A_{50} = \frac{M_{50}(f)}{D_{50}(f)} = \frac{6146.51}{17\,434.07} = 0.352557$$

$$B = S \cdot A_{50} = 20\,000 \cdot 0.352557 = 7051.14$$

Osiguranica mora uplatiti jednokratnu premiju visine 7051.14 €.

treći zadatak

Zadatak 3

Osiguranica starosti 35 *godina uplati mješovito životno osiguranje s istekom osiguranja po navršenih* 65 *godina života. Osigurana svota iznosi* 15 000 €.

a) *Koliku jednokratnu premiju mora uplatiti osiguranica?*

b) *Ukoliko umjesto jednokratne premije osiguranica želi uplaćivati godišnje premije, kolika je visina godišnjih premija?*

Rješenje

$$B = S \cdot A_{x:n\rceil}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

Rješenje

$$B = S \cdot A_{x:n\rceil}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \text{\_\_\_\_\_}$$

Rješenje

$$B = S \cdot A_{x:n\rceil}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06}{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad}$$

Rješenje

$$\boxed{B = S \cdot A_{x:n\rceil}} \qquad \boxed{A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06 + 6\,515.84}{}$$

Rješenje

$$B = S \cdot A_{x:n\rceil}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06 + 6\,515.84 - 5\,232.91}{}$$

Rješenje

$$B = S \cdot A_{x:n\rceil}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06 + 6\,515.84 - 5\,232.91}{29\,724.41}$$

Rješenje

$$B = S \cdot A_{x:n\rceil}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06 + 6\,515.84 - 5\,232.91}{29\,724.41} = 0.368216$$

Rješenje

$$B = S \cdot A_{x:n\rceil}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06 + 6\,515.84 - 5\,232.91}{29\,724.41} = 0.368216$$

$$B = S \cdot A_{35:30\rceil} =$$

Rješenje

$$B = S \cdot A_{x:n\rceil}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06 + 6\,515.84 - 5\,232.91}{29\,724.41} = 0.368216$$

$$B = S \cdot A_{35:30\rceil} = 15\,000$$

Rješenje

$$B = S \cdot A_{x:n\rceil}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06 + 6\,515.84 - 5\,232.91}{29\,724.41} = 0.368216$$

$$B = S \cdot A_{35:30\rceil} = 15\,000 \cdot 0.368216$$

Rješenje

$$\boxed{B = S \cdot A_{x:n\rceil}} \qquad \boxed{A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06 + 6\,515.84 - 5\,232.91}{29\,724.41} = 0.368216$$

$$B = S \cdot A_{35:30\rceil} = 15\,000 \cdot 0.368216 = 5523.24$$

Rješenje

$$\boxed{B = S \cdot A_{x:n\rceil}} \qquad \boxed{A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06 + 6\,515.84 - 5\,232.91}{29\,724.41} = 0.368216$$

$$B = S \cdot A_{35:30\rceil} = 15\,000 \cdot 0.368216 = 5523.24$$

Osiguranica mora uplatiti jednokratnu premiju visine 5523.24 €.

Rješenje

$$\boxed{B = S \cdot A_{x:n\rceil}} \qquad \boxed{A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06 + 6\,515.84 - 5\,232.91}{29\,724.41} = 0.368216$$

$$B = S \cdot A_{35:30\rceil} = 15\,000 \cdot 0.368216 = 5523.24$$

Osiguranica mora uplatiti jednokratnu premiju visine 5523.24 €.

Interpretacija broja $A_{35:30\rceil}$

Rješenje

$$B = S \cdot A_{x:n\rceil}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

a)

$$A_{35:30\rceil} = \frac{D_{65}(f) + M_{35}(f) - M_{65}(f)}{D_{35}(f)} =$$

$$= \frac{9\,662.06 + 6\,515.84 - 5\,232.91}{29\,724.41} = 0.368216$$

$$B = S \cdot A_{35:30\rceil} = 15\,000 \cdot 0.368216 = 5523.24$$

Osiguranica mora uplatiti jednokratnu premiju visine 5523.24 €.

Interpretacija broja $A_{35:30\rceil}$

Uplati li osiguranica premiju visine 0.37 €, u slučaju da u idućih 30 godina nastupi osigurani slučaj, obitelj ili ona sama će raspolagati osiguranom svotom visine 1 €.

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \text{\_\_\_\_\_}$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58}{\qquad\qquad\qquad\qquad}$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{}$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{29\,724.41}$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{29\,724.41} = 18.682774$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{29\,724.41} = 18.682774$$

$$B = S \cdot \frac{A_{35:30\rceil}}{\ddot{a}_{35:30\rceil}} =$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{29\,724.41} = 18.682774$$

$$B = S \cdot \frac{A_{35:30\rceil}}{\ddot{a}_{35:30\rceil}} = 15\,000$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}} \qquad \ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{29\,724.41} = 18.682774$$

$$B = S \cdot \frac{A_{35:30\rceil}}{\ddot{a}_{35:30\rceil}} = 15\,000 \cdot \text{————————}$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{29\,724.41} = 18.682774$$

$$B = S \cdot \frac{A_{35:30\rceil}}{\ddot{a}_{35:30\rceil}} = 15\,000 \cdot \frac{0.368216}{}$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}} \qquad \ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{29\,724.41} = 18.682774$$

$$B = S \cdot \frac{A_{35:30\rceil}}{\ddot{a}_{35:30\rceil}} = 15\,000 \cdot \frac{0.368216}{18.682774}$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}} \qquad \ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{29\,724.41} = 18.682774$$

$$B = S \cdot \frac{A_{35:30\rceil}}{\ddot{a}_{35:30\rceil}} = 15\,000 \cdot \frac{0.368216}{18.682774} = 295.63$$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}} \qquad \ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{29\,724.41} = 18.682774$$

$$B = S \cdot \frac{A_{35:30\rceil}}{\ddot{a}_{35:30\rceil}} = 15\,000 \cdot \frac{0.368216}{18.682774} = 295.63$$

Osiguranica mora tijekom 30 godina godišnje uplaćivati 295.63 €.

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}} \qquad \ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{29\,724.41} = 18.682774$$

$$B = S \cdot \frac{A_{35:30\rceil}}{\ddot{a}_{35:30\rceil}} = 15\,000 \cdot \frac{0.368216}{18.682774} = 295.63$$

Osiguranica mora tijekom 30 godina godišnje uplaćivati 295.63 €.

Interpretacija broja $\ddot{a}_{35:30\rceil}$

b)

$$B = S \cdot \frac{A_{x:n\rceil}}{\ddot{a}_{x:n\rceil}} \qquad \ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$\ddot{a}_{35:30\rceil} = \frac{N_{35}(f) - N_{65}(f)}{D_{35}(f)} =$$

$$= \frac{686\,310.58 - 130\,976.15}{29\,724.41} = 18.682774$$

$$B = S \cdot \frac{A_{35:30\rceil}}{\ddot{a}_{35:30\rceil}} = 15\,000 \cdot \frac{0.368216}{18.682774} = 295.63$$

Osiguranica mora tijekom 30 godina godišnje uplaćivati 295.63 €.

Interpretacija broja $\ddot{a}_{35:30\rceil}$

Uplati li osiguranica odmah 18.68 €, idućih 30 godina može dobivati godišnje rente visine 1 €.

četvrti zadatak

Zadatak 4

Osiguranik starosti 28 *godina uplati mješovito životno osiguranje s istekom osiguranja po navršenih* 65 *godina života. Godišnja premija iznosi* 5 000 *kn, a osigurana svota je* 250 000 *kn.*

a) *Izračunajte iznos premije privremene jedinične neodgođene osobne rente osiguranika i objasnite značenje dobivenog rezultata.*

b) *Izračunajte iznos jednokratne premije mješovitog osiguranja za jediničnu osiguranu svotu i objasnite značenje dobivenog rezultata.*

c) *Ako su zadani* α *i* γ *troškovi osiguranja* $\alpha = 0.032$ *i* $\gamma = 0.0022$, *izračunajte* β *troškove.*

d) *Ukoliko osiguranik umjesto godišnjih premija odluči uplatiti jednokratnu premiju, koliko bi iznosila ta premija?*

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$\ddot{a}_{28:37\rceil} = \frac{N_{28}(m) - N_{65}(m)}{D_{28}(m)} =$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$\ddot{a}_{28:37\rceil} = \frac{N_{28}(m) - N_{65}(m)}{D_{28}(m)} =$$

$$= \text{\_\_\_\_\_}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$\ddot{a}_{28:37\rceil} = \frac{N_{28}(m) - N_{65}(m)}{D_{28}(m)} =$$

$$= \frac{869\,668.78}{\qquad\qquad\qquad\qquad\qquad\qquad}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$\ddot{a}_{28:37\rceil} = \frac{N_{28}(m) - N_{65}(m)}{D_{28}(m)} =$$

$$= \frac{869\,668.78 - 95\,725.33}{}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$\ddot{a}_{28:37\rceil} = \frac{N_{28}(m) - N_{65}(m)}{D_{28}(m)} =$$

$$= \frac{869\,668.78 - 95\,725.33}{37\,654.02}$$

Rješenje

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

a)

$$\ddot{a}_{28:37\rceil} = \frac{N_{28}(m) - N_{65}(m)}{D_{28}(m)} =$$

$$= \frac{869\,668.78 - 95\,725.33}{37\,654.02} = 20.554072$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$\ddot{a}_{28:37\rceil} = \frac{N_{28}(m) - N_{65}(m)}{D_{28}(m)} =$$

$$= \frac{869\,668.78 - 95\,725.33}{37\,654.02} = 20.554072$$

Uplati li osiguranik odmah 20.55 kn, idućih 37 godina može dobivati godišnje rente visine 1 kn.

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

b)

$$A_{28:37\rceil} = \frac{D_{65}(m) + M_{28}(m) - M_{65}(m)}{D_{28}(m)} =$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

b)

$$A_{28:37\rceil} = \frac{D_{65}(m) + M_{28}(m) - M_{65}(m)}{D_{28}(m)} =$$

$$= \text{\_\_\_\_\_}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

b)

$$A_{28:37\rceil} = \frac{D_{65}(m) + M_{28}(m) - M_{65}(m)}{D_{28}(m)} =$$

$$= \frac{8\,322.27}{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

b)

$$A_{28:37\rceil} = \frac{D_{65}(m) + M_{28}(m) - M_{65}(m)}{D_{28}(m)} =$$

$$= \frac{8\,322.27 + 8\,244.93}{}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

b)

$$A_{28:37\rceil} = \frac{D_{65}(m) + M_{28}(m) - M_{65}(m)}{D_{28}(m)} =$$

$$= \frac{8\,322.27 + 8\,244.93 - 5\,085.18}{}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

b)

$$A_{28:37\rceil} = \frac{D_{65}(m) + M_{28}(m) - M_{65}(m)}{D_{28}(m)} =$$

$$= \frac{8\,322.27 + 8\,244.93 - 5\,085.18}{37\,654.02}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

b)

$$A_{28:37\rceil} = \frac{D_{65}(m) + M_{28}(m) - M_{65}(m)}{D_{28}(m)} =$$

$$= \frac{8\,322.27 + 8\,244.93 - 5\,085.18}{37\,654.02} = 0.304935$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

b)

$$A_{28:37\rceil} = \frac{D_{65}(m) + M_{28}(m) - M_{65}(m)}{D_{28}(m)} =$$

$$= \frac{8\,322.27 + 8\,244.93 - 5\,085.18}{37\,654.02} = 0.304935$$

Uplati li osiguranik premiju visine 0.30 kn, u slučaju da u idućih 37 godina nastupi osigurani slučaj, obitelj ili on sam će raspolagati osiguranom svotom visine 1 kn.

c)

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{28:37\rceil} = \frac{B}{S} =$$

c)

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{28:37\rceil} = \frac{B}{S} = \text{———}$$

c)

$$B = S \cdot P^{a}_{x:n]}$$

$$P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

$$P^{a}_{28:37]} = \frac{B}{S} = \frac{5\,000}{\qquad}$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}}$$

$$\boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000}$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

$$P^{a}_{28:37]} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

$$P^{a}_{28:37]} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^{a}_{28:37]} = \frac{A_{28:37]} + \alpha + \gamma \cdot \ddot{a}_{28:37]}}{(1-\beta)\ddot{a}_{28:37]}}$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

$$P^{a}_{28:37]} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^{a}_{28:37]} = \frac{A_{28:37]} + \alpha + \gamma \cdot \ddot{a}_{28:37]}}{(1-\beta)\ddot{a}_{28:37]}} \Bigg/ \cdot (1-\beta)\ddot{a}_{28:37]}$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^{a}_{28:37\rceil} = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{(1-\beta)\ddot{a}_{28:37\rceil}} \Bigg/ \cdot (1-\beta)\ddot{a}_{28:37\rceil}$$

$$P^{a}_{28:37\rceil} \cdot (1-\beta)\ddot{a}_{28:37\rceil} =$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^{a}_{28:37\rceil} = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{(1-\beta)\ddot{a}_{28:37\rceil}} \Bigg/ \cdot (1-\beta)\ddot{a}_{28:37\rceil}$$

$$P^{a}_{28:37\rceil} \cdot (1-\beta)\ddot{a}_{28:37\rceil} = A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^{a}_{28:37\rceil} = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{(1-\beta)\ddot{a}_{28:37\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{28:37\rceil}$$

$$P^{a}_{28:37\rceil} \cdot (1-\beta)\ddot{a}_{28:37\rceil} = A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil} \Big/ : P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}$$

c)

$$\boxed{B = S \cdot P^a_{x:n\rceil}} \qquad \boxed{P^a_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^a_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^a_{28:37\rceil} = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{(1-\beta)\ddot{a}_{28:37\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{28:37\rceil}$$

$$P^a_{28:37\rceil} \cdot (1-\beta)\ddot{a}_{28:37\rceil} = A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil} \Big/ : P^a_{28:37\rceil}\ddot{a}_{28:37\rceil}$$

$$1 - \beta =$$

c)

$$\boxed{B = S \cdot P^a_{x:n\rceil}} \qquad \boxed{P^a_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^a_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^a_{28:37\rceil} = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{(1-\beta)\ddot{a}_{28:37\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{28:37\rceil}$$

$$P^a_{28:37\rceil} \cdot (1-\beta)\ddot{a}_{28:37\rceil} = A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil} \Big/ : P^a_{28:37\rceil}\ddot{a}_{28:37\rceil}$$

$$1 - \beta = \text{———————————}$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^{a}_{28:37\rceil} = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{(1-\beta)\ddot{a}_{28:37\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{28:37\rceil}$$

$$P^{a}_{28:37\rceil} \cdot (1-\beta)\ddot{a}_{28:37\rceil} = A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil} \Big/ : P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}$$

$$1 - \beta = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{}$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^{a}_{28:37\rceil} = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{(1-\beta)\ddot{a}_{28:37\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{28:37\rceil}$$

$$P^{a}_{28:37\rceil} \cdot (1-\beta)\ddot{a}_{28:37\rceil} = A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil} \Big/ : P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}$$

$$1 - \beta = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}}$$

c)

$$\boxed{B = S \cdot P^a_{x:n\rceil}} \qquad \boxed{P^a_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^a_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^a_{28:37\rceil} = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{(1-\beta)\ddot{a}_{28:37\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{28:37\rceil}$$

$$P^a_{28:37\rceil} \cdot (1-\beta)\ddot{a}_{28:37\rceil} = A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil} \Big/ : P^a_{28:37\rceil}\ddot{a}_{28:37\rceil}$$

$$1 - \beta = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^a_{28:37\rceil}\ddot{a}_{28:37\rceil}}$$

$$-\beta =$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^{a}_{28:37\rceil} = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{(1-\beta)\ddot{a}_{28:37\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{28:37\rceil}$$

$$P^{a}_{28:37\rceil} \cdot (1-\beta)\ddot{a}_{28:37\rceil} = A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil} \Big/ : P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}$$

$$1 - \beta = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}}$$

$$-\beta = -1$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

$$P^{a}_{28:37]} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^{a}_{28:37]} = \frac{A_{28:37]} + \alpha + \gamma \cdot \ddot{a}_{28:37]}}{(1-\beta)\ddot{a}_{28:37]}} \Big/ \cdot (1-\beta)\ddot{a}_{28:37]}$$

$$P^{a}_{28:37]} \cdot (1-\beta)\ddot{a}_{28:37]} = A_{28:37]} + \alpha + \gamma \cdot \ddot{a}_{28:37]} \Big/ : P^{a}_{28:37]}\ddot{a}_{28:37]}$$

$$1-\beta = \frac{A_{28:37]} + \alpha + \gamma \cdot \ddot{a}_{28:37]}}{P^{a}_{28:37]}\ddot{a}_{28:37]}}$$

$$-\beta = -1 + \frac{A_{28:37]} + \alpha + \gamma \cdot \ddot{a}_{28:37]}}{P^{a}_{28:37]}\ddot{a}_{28:37]}}$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^{a}_{28:37\rceil} = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{(1-\beta)\ddot{a}_{28:37\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{28:37\rceil}$$

$$P^{a}_{28:37\rceil} \cdot (1-\beta)\ddot{a}_{28:37\rceil} = A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil} \Big/ : P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}$$

$$1 - \beta = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}}$$

$$-\beta = -1 + \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}} \Big/ \cdot (-1)$$

c)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{28:37\rceil} = \frac{B}{S} = \frac{5\,000}{250\,000} = 0.02$$

$$P^{a}_{28:37\rceil} = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{(1-\beta)\ddot{a}_{28:37\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{28:37\rceil}$$

$$P^{a}_{28:37\rceil} \cdot (1-\beta)\ddot{a}_{28:37\rceil} = A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil} \Big/ : P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}$$

$$1 - \beta = \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}}$$

$$-\beta = -1 + \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}} \Big/ \cdot (-1)$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad}{}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935}{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 +}{}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032}{}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 +}{}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022}{\qquad\qquad\qquad\qquad\qquad\qquad}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot}{}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot 20.554072}{}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot 20.554072}{0.02}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot 20.554072}{0.02 \cdot}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot 20.554072}{0.02 \cdot 20.554072}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\,\ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot 20.554072}{0.02 \cdot 20.554072}$$

$$\beta = 0.070369$$

$$A^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{1-\beta}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\, \ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot 20.554072}{0.02 \cdot 20.554072}$$

$$\beta = 0.070369$$

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$B' = S \cdot A^{a}_{x:n\rceil}$$

d)

$$A^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{1-\beta}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\, \ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot 20.554072}{0.02 \cdot 20.554072}$$

$$\beta = 0.070369$$

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$B' = S \cdot A^{a}_{x:n\rceil}$$

d)

$$B' = B \cdot \ddot{a}_{28:37\rceil} =$$

$$A^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{1-\beta}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\, \ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot 20.554072}{0.02 \cdot 20.554072}$$

$$\beta = 0.070369$$

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$B' = S \cdot A^{a}_{x:n\rceil}$$

d)

$$B' = B \cdot \ddot{a}_{28:37\rceil} = 5\,000$$

$$A^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{1-\beta}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\, \ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot 20.554072}{0.02 \cdot 20.554072}$$

$$\beta = 0.070369$$

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$B' = S \cdot A^{a}_{x:n\rceil}$$

d)

$$B' = B \cdot \ddot{a}_{28:37\rceil} = 5\,000 \cdot 20.554072$$

$$A^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{1-\beta}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\, \ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot 20.554072}{0.02 \cdot 20.554072}$$

$$\beta = 0.070369$$

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$B' = S \cdot A^{a}_{x:n\rceil}$$

d)

$$B' = B \cdot \ddot{a}_{28:37\rceil} = 5\,000 \cdot 20.554072 = 102\,770.36$$

$$A^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{1 - \beta}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1 - \beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$\beta = 1 - \frac{A_{28:37\rceil} + \alpha + \gamma \cdot \ddot{a}_{28:37\rceil}}{P^{a}_{28:37\rceil}\, \ddot{a}_{28:37\rceil}}$$

$$\beta = 1 - \frac{0.304935 + 0.032 + 0.0022 \cdot 20.554072}{0.02 \cdot 20.554072}$$

$$\beta = 0.070369$$

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$B' = S \cdot A^{a}_{x:n\rceil}$$

d) Jednokratna premija iznosi 102 770.36 kn.

$$B' = B \cdot \ddot{a}_{28:37\rceil} = 5\,000 \cdot 20.554072 = 102\,770.36$$

peti zadatak

Zadatak 5

Osiguranica starosti 42 *godine uplati mješovito životno osiguranje s istekom osiguranja nakon navršenih* 65 *godina života. Godišnja premija iznosi* 3 050 *kn, a osigurana svota* 74 500 *kn.*

a) *Ako su* β *i* γ *troškovi osiguranja* $\beta = 0.03$ *i* $\gamma = 0.004$, *izračunajte* α *troškove.*

b) *Ako se svi troškovi udvostruče, koliko bi uz trostruko veću osiguranu svotu iznosila godišnja premija?*

c) *Koliko iznosi premija koju osiguranica mora uplatiti odmah da bi iduće* 23 *godine mogla dobivati osobnu rentu visine godišnje premije mješovitog osiguranja?*

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \text{———}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{\qquad}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \text{\_\_\_\_\_}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41}{\qquad\qquad}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 -}{}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{23\,253.48}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{23\,253.48} = 15.805301$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{23\,253.48} = 15.805301$$

$$A_{42:23\rceil} = \frac{D_{65}(f) + M_{42}(f) - M_{65}(f)}{D_{42}(f)}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{23\,253.48} = 15.805301$$

$$A_{42:23\rceil} = \frac{D_{65}(f) + M_{42}(f) - M_{65}(f)}{D_{42}(f)} =$$

$$= \text{\_\_\_\_\_}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{23\,253.48} = 15.805301$$

$$A_{42:23\rceil} = \frac{D_{65}(f) + M_{42}(f) - M_{65}(f)}{D_{42}(f)} =$$

$$= \frac{9\,662.06}{}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{23\,253.48} = 15.805301$$

$$A_{42:23\rceil} = \frac{D_{65}(f) + M_{42}(f) - M_{65}(f)}{D_{42}(f)} =$$

$$= \frac{9\,662.06 +}{}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{23\,253.48} = 15.805301$$

$$A_{42:23\rceil} = \frac{D_{65}(f) + M_{42}(f) - M_{65}(f)}{D_{42}(f)} =$$

$$= \frac{9\,662.06 + 6\,395.84}{}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{23\,253.48} = 15.805301$$

$$A_{42:23\rceil} = \frac{D_{65}(f) + M_{42}(f) - M_{65}(f)}{D_{42}(f)} =$$

$$= \frac{9\,662.06 + 6\,395.84 -}{}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{23\,253.48} = 15.805301$$

$$A_{42:23\rceil} = \frac{D_{65}(f) + M_{42}(f) - M_{65}(f)}{D_{42}(f)} =$$

$$= \frac{9\,662.06 + 6\,395.84 - 5\,232.91}{}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

a)

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{23\,253.48} = 15.805301$$

$$A_{42:23\rceil} = \frac{D_{65}(f) + M_{42}(f) - M_{65}(f)}{D_{42}(f)} =$$

$$= \frac{9\,662.06 + 6\,395.84 - 5\,232.91}{23\,253.48}$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

Rješenje

a)

$$B = S \cdot P^{a}_{x:n\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{B}{S} = \frac{3\,050}{74\,500} = 0.040940$$

$$\ddot{a}_{42:23\rceil} = \frac{N_{42}(f) - N_{65}(f)}{D_{42}(f)} = \frac{498\,504.41 - 130\,976.15}{23\,253.48} = 15.805301$$

$$A_{42:23\rceil} = \frac{D_{65}(f) + M_{42}(f) - M_{65}(f)}{D_{42}(f)} =$$

$$= \frac{9\,662.06 + 6\,395.84 - 5\,232.91}{23\,253.48} = 0.465521$$

$$A_{x:n\rceil} = \frac{D_{x+n} + M_x - M_{x+n}}{D_x}$$

$$\ddot{a}_{x:n\rceil} = \frac{N_x - N_{x+n}}{D_x}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Bigg/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} =$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha =$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha =$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$\alpha =$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940 \cdot$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940 \cdot (1-0.03)$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940 \cdot (1-0.03) \cdot$$

$$\boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940 \cdot (1-0.03) \cdot 15.805301$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940 \cdot (1-0.03) \cdot 15.805301 -$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940 \cdot (1-0.03) \cdot 15.805301 - 0.465521$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940 \cdot (1-0.03) \cdot 15.805301 - 0.465521 -$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940 \cdot (1-0.03) \cdot 15.805301 - 0.465521 - 0.004$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940 \cdot (1-0.03) \cdot 15.805301 - 0.465521 - 0.004 \cdot$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940 \cdot (1-0.03) \cdot 15.805301 - 0.465521 - 0.004 \cdot 15.805301$$

$$P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}}{(1-\beta)\ddot{a}_{42:23\rceil}} \Big/ \cdot (1-\beta)\ddot{a}_{42:23\rceil}$$

$$P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} = A_{42:23\rceil} + \alpha + \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$-\alpha = A_{42:23\rceil} + \gamma \cdot \ddot{a}_{42:23\rceil} - P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} \Big/ \cdot (-1)$$

$$\alpha = P^{a}_{42:23\rceil} \cdot (1-\beta)\ddot{a}_{42:23\rceil} - A_{42:23\rceil} - \gamma \cdot \ddot{a}_{42:23\rceil}$$

$$\alpha = 0.040940 \cdot (1-0.03) \cdot 15.805301 - 0.465521 - 0.004 \cdot 15.805301$$

$$\alpha = 0.098915$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$= \text{\_\_\_\_\_}$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$= \frac{0.465521}{}$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$= \frac{0.465521 +}{}$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915}{}$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}{(1-2\beta)\ddot{a}_{42:23]} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 +}{}$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004}{}$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot}{}$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{}$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03)}$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot}$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301}$$

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

b)

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$\boxed{B = S \cdot P^{a}_{x:n]}} \qquad \boxed{P^{a}_{x:n]} = \frac{A_{x:n]} + \alpha + \gamma \cdot \ddot{a}_{x:n]}}{(1-\beta) \cdot \ddot{a}_{x:n]}}$$

b)

$$P^{a}_{42:23]} = \frac{A_{42:23]} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23]}}{(1-2\beta)\ddot{a}_{42:23]}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^{a}_{42:23]} =$$

b)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^{a}_{42:23\rceil} = 3 \cdot 74\,500$$

b)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^{a}_{42:23\rceil} = 3 \cdot 74\,500 \cdot$$

b)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^{a}_{42:23\rceil} = 3 \cdot 74\,500 \cdot 0.053160$$

b)

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^{a}_{42:23\rceil} = 3 \cdot 74\,500 \cdot 0.053160 = 11\,881.26$$

$$\boxed{B = S \cdot P^a_{x:n\rceil}} \qquad \boxed{P^a_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

b)

$$P^a_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^a_{42:23\rceil} = 3 \cdot 74\,500 \cdot 0.053160 = 11\,881.26$$

Godišnja premija iznosila bi 11 881.26 kn.

$$\boxed{B = S \cdot P^a_{x:n\rceil}} \qquad \boxed{P^a_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

b)

$$P^a_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^a_{42:23\rceil} = 3 \cdot 74\,500 \cdot 0.053160 = 11\,881.26$$

Godišnja premija iznosila bi 11 881.26 kn.

c)

$$B = S \cdot \ddot{a}_{42:23\rceil} =$$

$$\boxed{B = S \cdot P^a_{x:n\rceil}} \qquad \boxed{P^a_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

b)

$$P^a_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^a_{42:23\rceil} = 3 \cdot 74\,500 \cdot 0.053160 = 11\,881.26$$

Godišnja premija iznosila bi 11 881.26 kn.

c)

$$B = S \cdot \ddot{a}_{42:23\rceil} = 3\,050$$

$$\boxed{B = S \cdot P^a_{x:n\rceil}} \qquad \boxed{P^a_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

b)

$$P^a_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^a_{42:23\rceil} = 3 \cdot 74\,500 \cdot 0.053160 = 11\,881.26$$

Godišnja premija iznosila bi 11 881.26 kn.

c)

$$B = S \cdot \ddot{a}_{42:23\rceil} = 3\,050 \cdot$$

$$\boxed{B = S \cdot P^a_{x:n\rceil}} \qquad \boxed{P^a_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

b)

$$P^a_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^a_{42:23\rceil} = 3 \cdot 74\,500 \cdot 0.053160 = 11\,881.26$$

Godišnja premija iznosila bi 11 881.26 kn.

c)

$$B = S \cdot \ddot{a}_{42:23\rceil} = 3\,050 \cdot 15.805301$$

$$\boxed{B = S \cdot P^a_{x:n\rceil}} \qquad \boxed{P^a_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

b)

$$P^a_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^a_{42:23\rceil} = 3 \cdot 74\,500 \cdot 0.053160 = 11\,881.26$$

Godišnja premija iznosila bi 11 881.26 kn.

c)

$$B = S \cdot \ddot{a}_{42:23\rceil} = 3\,050 \cdot 15.805301 = 48\,206.17$$

$$\boxed{B = S \cdot P^{a}_{x:n\rceil}} \qquad \boxed{P^{a}_{x:n\rceil} = \frac{A_{x:n\rceil} + \alpha + \gamma \cdot \ddot{a}_{x:n\rceil}}{(1-\beta) \cdot \ddot{a}_{x:n\rceil}}}$$

b)

$$P^{a}_{42:23\rceil} = \frac{A_{42:23\rceil} + 2\alpha + 2\gamma \cdot \ddot{a}_{42:23\rceil}}{(1-2\beta)\ddot{a}_{42:23\rceil}} =$$

$$= \frac{0.465521 + 2 \cdot 0.098915 + 2 \cdot 0.004 \cdot 15.805301}{(1 - 2 \cdot 0.03) \cdot 15.805301} =$$

$$= 0.053160$$

$$B = 3S \cdot P^{a}_{42:23\rceil} = 3 \cdot 74\,500 \cdot 0.053160 = 11\,881.26$$

Godišnja premija iznosila bi 11 881.26 kn.

c)

$$B = S \cdot \ddot{a}_{42:23\rceil} = 3\,050 \cdot 15.805301 = 48\,206.17$$

Osiguranica bi morala odmah uplatiti premiju visine 48 206.17 kn.