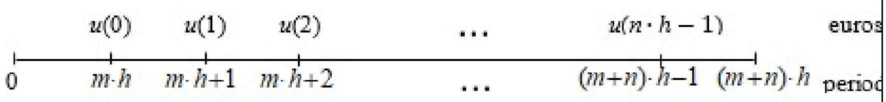
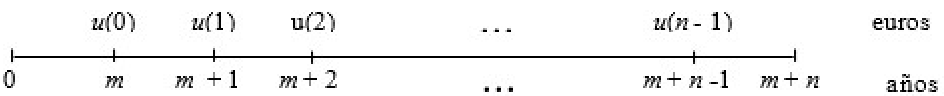
## RENTAS DE SUPERVIVENCIA CON IGUAL FRECUENCIA DE VARIACIÓN $h$ Y DE PAGO $h'$.

$$\rightarrow h = h'$$

| **Prepagable** |  |
|---|---|
| Expresión General | $_{m/}\underset{[u(t-m\cdot h)]}{V^{(h)}}\ddot{a}_{x:\overline{n}\rvert} = \sum_{t=m\cdot h}^{(m+n)\cdot h-1} u(t-m\cdot h)\cdot(1+I_1)^{-t/h}\cdot\frac{l^{(h)}_{x\cdot h+t}}{l^{(h)}_{x\cdot h}}$ |
| Renta Constante | $u(t-m\cdot h)=C$ <br><br> $C\cdot {}_{m/}\ddot{a}^{(h)}_{x:\overline{n}\rvert}=C\cdot\sum_{t=m\cdot h}^{(m+n)\cdot h-1}(1+I_1)^{-t/h}\cdot\frac{l^{(h)}_{x\cdot h+t}}{l^{(h)}_{x\cdot h}}$ |
| Renta variable progresión aritmética | $u(t-m\cdot h)=u_0+u_1(t-m\cdot h)$ <br><br> $_{m/}\underset{\begin{bmatrix}u_0\\u_1\end{bmatrix}}{V^{(h)}}\ddot{a}_{x:\overline{n}\rvert} = \sum_{t=m\cdot h}^{(m+n)\cdot h-1}(u_0+u_1(t-m\cdot h))\cdot(1+I_1)^{-t/h}\cdot\frac{l^{(h)}_{x\cdot h+t}}{l^{(h)}_{x\cdot h}}$ |
| Renta variable progresión geométrica | $u(t-m\cdot h)=u_0\cdot q^{t-m\cdot h}$ <br><br> $_{m/}\underset{\begin{bmatrix}u_0\\q\end{bmatrix}}{V^{(h)}}\ddot{a}_{x:\overline{n}\rvert} = \sum_{t=m\cdot h}^{(m+n)\cdot h-1}u_0\cdot q^{t-m\cdot h}\cdot(1+I_1)^{-t/h}\cdot\frac{l^{(h)}_{x\cdot h+t}}{l^{(h)}_{x\cdot h}}$ |

Caso particular que $h=1$




$$_{m/}\underset{[u(t-m)]}{V}\ddot{a}_{x:\overline{n}\rvert} = \sum_{t=m}^{m+n-1} u(t-m)\cdot {}_tE_x = \sum_{t=m}^{m+n-1} u(t-m)\cdot(1+I_1)^{-t}\cdot {}_tP_x = \sum_{t=m}^{m+n-1} u(t-m)\cdot(1+I_1)^{-t}\cdot\frac{l_{x+t}}{l_x}$$

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$$\rightarrow h = h'$$

| | |
|---|---|
| **Pospagable** | $u(0)$ $u(1)$ … $u(n\cdot h-2)$ $u(n\cdot h-1)$ euros <br> $0$ $m\cdot h$ $m\cdot h+1$ $m\cdot h+2$ … $(m+n)\cdot h-1$ $(m+n)\cdot h$ periodos |
| Expresión General | $_{m/}\underset{[u(t-m\cdot h)]}{V^{(h)}}a_{x:\overline{n}\rceil} = \sum_{t=m\cdot h}^{(m+n)\cdot h-1} u(t-m\cdot h)\cdot(1+I_1)^{-(t+1)/h}\cdot\frac{l^{(h)}_{x\cdot h+t+1}}{l^{(h)}_{x\cdot h}}$ |
| Renta Constante | $u(t-m\cdot h)=C$ <br> $C\cdot {}_{m/}a^{(h)}_{x:\overline{n}\rceil} = C\cdot\sum_{t=m\cdot h}^{(m+n)\cdot h-1}(1+I_1)^{-(t+1)/h}\cdot\frac{l^{(h)}_{x\cdot h+t+1}}{l^{(h)}_{x\cdot h}}$ |
| Renta variable progresión aritmética | $u(t-m\cdot h)=u_0+u_1(t-m\cdot h)$ <br> $_{m/}\underset{\begin{bmatrix}u_0\\u_1\end{bmatrix}}{V^{(h)}}a_{x:\overline{n}\rceil} = \sum_{t=m\cdot h}^{(m+n)\cdot h-1}\left(u_0+u_1(t-m\cdot h)\right)\cdot(1+I_1)^{-(t+1)/h}\cdot\frac{l^{(h)}_{x\cdot h+t+1}}{l^{(h)}_{x\cdot h}}$ |
| Renta variable progresión geométrica | $u(t-m\cdot h)=u_0\cdot q^{t-m\cdot h}$ <br> $_{m/}\underset{\begin{bmatrix}u_0\\q\end{bmatrix}}{V^{(h)}}a_{x:\overline{n}\rceil} = \sum_{t=m\cdot h}^{(m+n)\cdot h-1} u_0\cdot q^{t-m\cdot h}\cdot(1+I_1)^{-(t+1)/h}\cdot\frac{l^{(h)}_{x\cdot h+t+1}}{l^{(h)}_{x\cdot h}}$ |

Caso particular que $h=1$, renta anual:

$u(0)$ $u(1)$ … $u(n\text{-}2)$ $u(n\text{-}1)$ euros

$0$ $m$ $m+1$ $m+2$ … $m+n\text{-}1$ $m+n$ años

$$_{m/}\underset{[u(t-m)]}{V}a_{x:\overline{n}\rceil} = \sum_{t=m}^{m+n-1} u(t-m)\cdot {}_{t+1}E_x = \sum_{t=m}^{m+n-1} u(t-m)\cdot(1+I_1)^{-(t+1)}\cdot {}_{t+1}P_x = \sum_{t=m}^{m+n-1} u(t-m)\cdot(1+I_1)^{-(t+1)}\cdot\frac{l_{x+t+1}}{l_x}$$