

9.3 Annuity Formulae 1

Sunday, October 25, 2020

11:33 AM

$$\delta = i/(1+i)$$

A , Paid at $t=1, 2, 3, \dots, T$

$$S(A, T, \delta) = A\delta^1 + A\delta^2 + \dots + A\delta^T$$

$$\hookrightarrow \delta S = A\delta^2 + A\delta^3 + \dots + A\delta^{T+1}$$

$$\hookrightarrow S - \delta S = A\delta - A\delta^{T+1}$$

$$\hookrightarrow (1-\delta)S = A(\delta - \delta^{T+1}) = A\delta(1-\delta)^T$$

$$\hookrightarrow S(A, T, \delta) = A\delta(1-\delta)^{-1}(1-\delta)^{-T}$$

$$\hookrightarrow S = Aa(A, T, \delta)$$

$$\hookrightarrow a(A, T, \delta) = \delta/(1-\delta)(1-\delta)^{-T}$$

$$i = 4\% \quad A = 8 \quad T = 11$$

$$\delta = i/1.04 \quad a = (1/1.04) / [(1 - 1/1.04) \cdot (1 - (1/1.04)^{11})] = 8.76$$

$$S = 8 \cdot 8.76 = 70.08$$