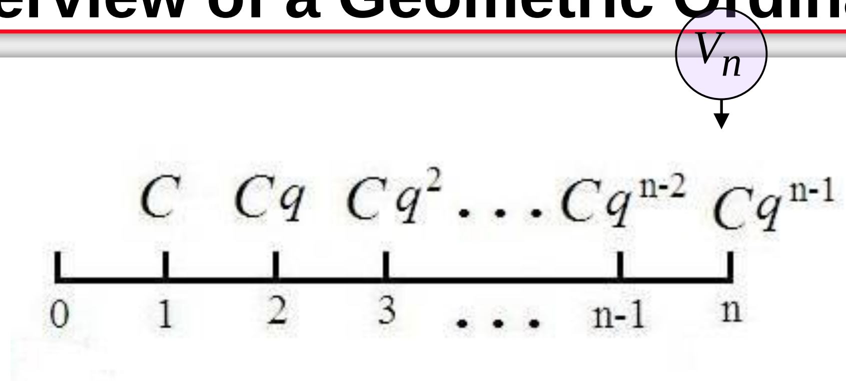
Overview of a Geometric Ordinary Annuity - FV



$$V_n = C(1+i)^{n-1} + Cq(1+i)^{n-2} + Cq^2(1+i)^{n-3} + \cdots + Cq^{n-1}$$

$$V_n = C\underbrace{\left((1+i)^{n-1} + q(1+i)^{n-2} + q^2(1+i)^{n-3} + \cdots + q^{n-1}\right)}_{r=q(1+i)^{-1}}$$

$$S = \frac{a_1 - a_n.r}{1-r}$$

$$V_n = C\frac{(1+i)^{n-1} - q^{n-1}q(1+i)^{-1}}{1-q(1+i)^{-1}} = C\frac{(1+i)^{-1}\left((1+i)^n - q^n\right)}{1-q(1+i)^{-1}}$$

$$V_n = C\frac{(1+i)^n - q^n}{(1+i)\left(1-q(1+i)^{-1}\right)} = C\frac{(1+i)^n - q^n}{1+i-q} \quad \text{si } \; q \neq 1+i$$

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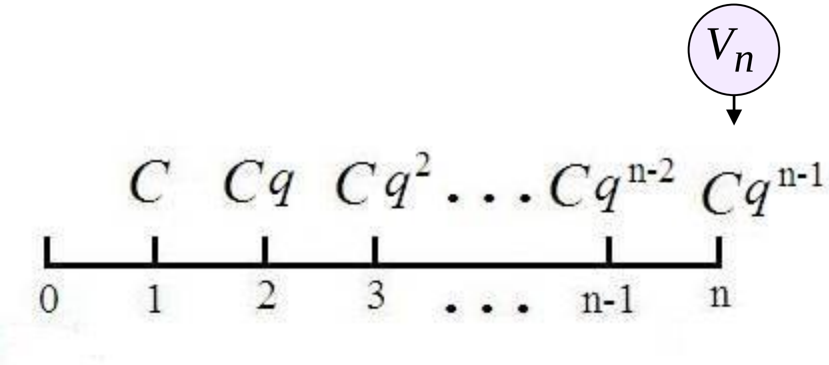


$$V_n = C\frac{(1+i)^n - q^n}{1+i-q} \quad \text{si} \quad q \neq 1+i$$

$$V_n = C(1+i)^{n-1} + Cq(1+i)^{n-2} + Cq^2(1+i)^{n-3} + \cdots + Cq^{n-1}$$

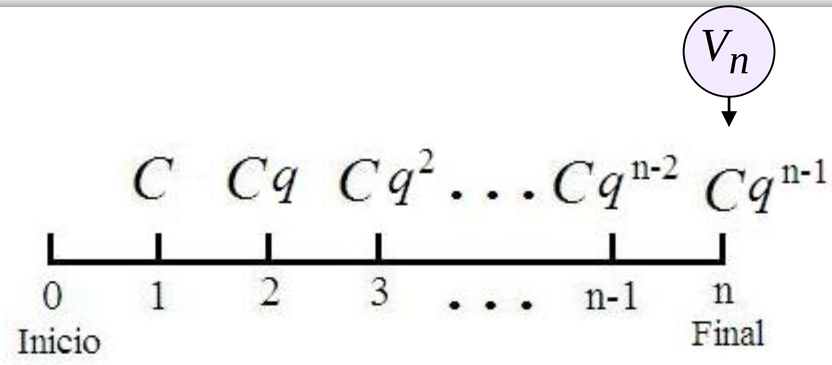
If $q = 1+i$

$$V_n = C(1+i)^{n-1} + C(1+i)(1+i)^{n-2} + C(1+i)^2(1+i)^{n-3} + \cdots + C(1+i)^{n-1}$$

$$V_n = C(1+i)^{n-1} + C(1+i)^{n-1} + C(1+i)^{n-1} + \cdots + C(1+i)^{n-1}$$

$$V_n = Cn(1+i)^{n-1}$$

Overview of a Geometric Ordinary Annuity- FV

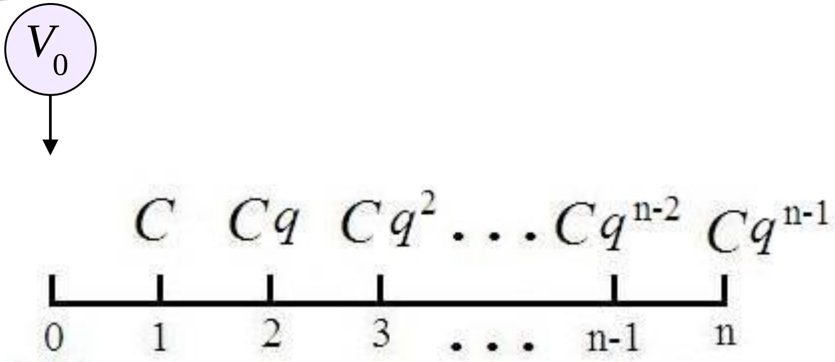


$$V_n = C(1+i)^{n-1} + Cq(1+i)^{n-2} + Cq^2(1+i)^{n-3} + \cdots + Cq^{n-1}$$

FINAL VALUE

$$V_n = S_{(C,q)_{\overline{n|}i}} = C \cdot S_{(1,q)_{\overline{n|}i}} = \begin{cases} C\dfrac{(1+i)^n - q^n}{1+i-q} & \text{si } \ q \neq 1+i \\ Cn(1+i)^{n-1} & \text{si } \ q = 1+i \end{cases}$$

Overview of a Geometric Ordinary Annuity--PV



$$V_0 = C(1+i)^{-1} + Cq(1+i)^{-2} + Cq^2(1+i)^{-3} + \cdots + Cq^{n-1}(1+i)^{-n}$$

$$V_0 = \begin{cases} C\dfrac{(1+i)^n - q^n}{1+i-q}(1+i)^{-n} & \text{si } q \neq 1+i \\ Cn(1+i)^{n-1}(1+i)^{-n} & \text{si } q = 1+i \end{cases}$$

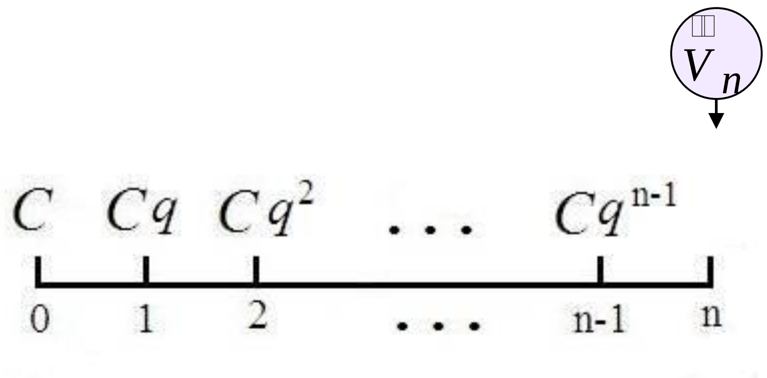
PRESENT VALUE

$$V_0 = a_{(C,q)\,\overline{n|}\,i} = C \cdot a_{(1,q)\,\overline{n|}\,i} = \begin{cases} C\dfrac{1-\left(\dfrac{q}{1+i}\right)^n}{1+i-q} & \text{si } 1+i \neq q \\ C \cdot n \cdot (1+i)^{-1} & \text{si } 1+i = q \end{cases}$$

Property

$$S_{(1,q)\,\overline{n|}\,i} = a_{(1,q)\,\overline{n|}\,i}\,(1+i)^n$$

Geometric Annuity Due- FV



$$V_n = (1+i)V_n$$

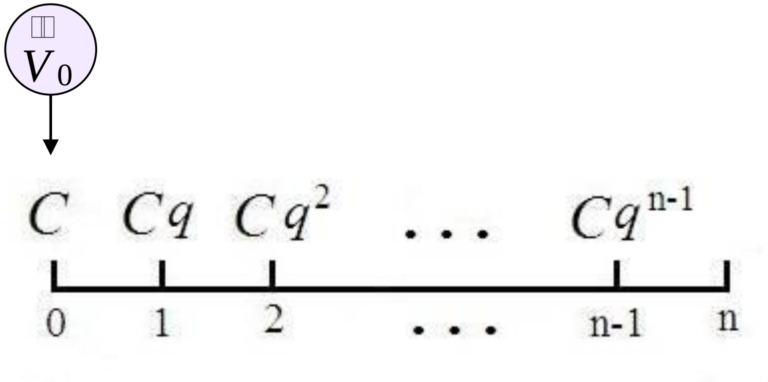
FUTURE VALUE

$$\ddot{V}_n = \ddot{S}_{(C,q)\overline{n}|i} = C\cdot \ddot{S}_{(1,q)\overline{n}|i} = \begin{cases} C\dfrac{(1+i)^n - q^n}{1+i-q}(1+i) & \text{si } 1+i \neq q \\ C\cdot n\cdot (1+i)^n & \text{si } 1+i = q \end{cases}$$

Property

$$\ddot{S}_{(C,q)\overline{n}|i} = S_{(C,q)\overline{n}|i}(1+i)$$

Overview of a Geometric Annuity Due - PV



Sabemos que: $\ddot{V}_0 = (1+i)V_0$

PRESENT VALUE

$$\ddot{V}_0 = \ddot{a}_{(C,q)\,\overline{n}|i} = C \cdot \ddot{a}_{(1,q)\,\overline{n}|i} = \begin{cases} C \dfrac{1-\left(\dfrac{q}{1+i}\right)^n}{1+i-q}(1+i) & \text{si } 1+i \neq q \\ C \cdot n & \text{si } 1+i = q \end{cases}$$

Properties

$$\ddot{a}_{(C,q)\,\overline{n}|i} = a_{(C,q)\,\overline{n}|i}(1+i)$$

$$\ddot{S}_{(C,q)\,\overline{n}|i} = \ddot{a}_{(C,q)\,\overline{n}|i}(1+i)^n$$