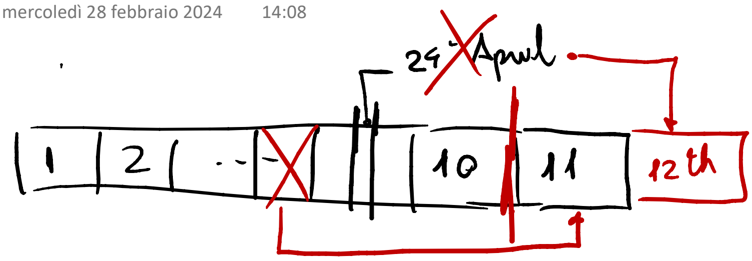
mercoledì 28 febbraio 2024 14:08



Monday : $11 \div 13$ until April 15

Tuesday : $14 \div 16$

INTERNAL RATE OF RETURN

$$OF = \{ (x_0, x_1, x_2, \dots, x_m) ; (t_0, t_1, t_2, \dots, t_m) \}$$

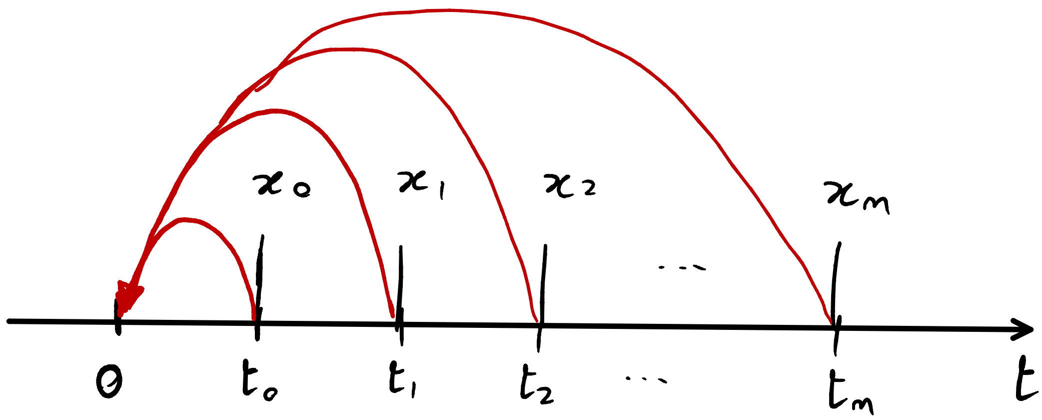
If $x_j > 0$ entry

If $x_j < 0$ exit

(Annual) interest rate : i

Present value of this financial operation :

$$w(OF, 0) = ?$$



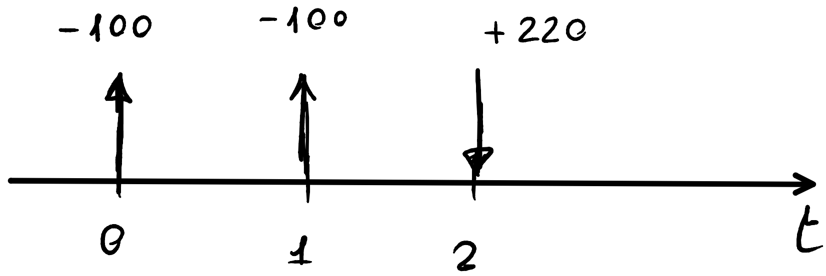
$$w(OF, 0) = x_0 (1+i)^{-t_0} + x_1 (1+i)^{-t_1} +$$

$$+ x_2 (1+i)^{-t_2} + \dots + x_m (1+i)^{-t_m}$$

The particular value such that the present value of this complex financial operation is equal to 0 is called the internal rate of return.

EX22: Determine the IRR of the following financial project:

$$L'OF = \{(-100, -100, +220); (0, 1, 2)\}$$



$$W(OF, 0) = -100(1+i)^{-0} - 100(1+i)^{-1} + 220(1+i)^{-2}$$

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

$$v = \frac{1}{1+i}$$

$$\cancel{W(OF, 0)} = -100 - 100v + 220v^2$$

0

$$220v^2 - 100v - 100 = 0$$

$$2.2v^2 - v - 1 = 0$$

$$\Delta = 1^2 + 4 \cdot 2.2 = 1 + 8.8 = 9.8$$

$$v = \frac{1 \pm \sqrt{9.8}}{4.4}$$

$$v = \frac{1 + \sqrt{9.8}}{4.4} \cong 0.9387$$

$$v = \frac{1}{1+i}$$

$$\frac{1}{v} = 1 + i$$

$$i = \frac{1}{v} - 1 \cong 0.0652$$

$V1 = \begin{bmatrix} 1, & 2, & 4 \end{bmatrix}$ ---- row vector

$V2 = \begin{bmatrix} 3 & 4 \end{bmatrix}$ another row vector

$V3 = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}$ column vector

$V4 = \begin{bmatrix} -2 \\ 1 \end{bmatrix}$ another column vector

$\begin{bmatrix} 5 \end{bmatrix}$

$\boxed{5}$

a

$V1 = [1, 2, 4]$

In terms of computer memory:

V1	1	2	4

V2	3	4

V3	
	1
	0
	-1

In Mathematics and Physics they are called vectors, in Computer Science they are called arrays.

A string is a sequence of characters

$\boxed{5}$

a

city | Macerata |

cities = | "Macerata" | "Ancona" | "Camerino" |

$V1 = [1, 2, 4]$

$V6 = [-1, 0, -1]$

$$V1 + V6 = [\underset{1}{1}, \underset{2}{2}, \underset{3}{4}] + [\underset{1}{-1}, \underset{2}{0}, \underset{3}{-1}] =$$

$$= [\underset{1}{1 + (-1)}, \underset{2}{2 + 0}, \underset{3}{4 + (-1)}] =$$

$$= [\underset{1}{0}, \underset{2}{2}, \underset{3}{3}] \quad V7$$

$$V1 + V2 = [\underset{1}{1}\ \underset{2}{2}\ \underset{3}{4}] + [\underset{1}{3}\ \underset{2}{4}\ \underset{3}{}] \times$$

In this case I cannot sum the two vectors because they don't have the same size, where the size of a vector is given by the vectors because they don't have the same size, where the size of a vector is given by the number of rows and columns.

$$V1 = \left.\overbrace{\begin{bmatrix} 1 & 2 & 4 \end{bmatrix}}^{3 \text{ columns}}\right\}\ 1 \text{ row}$$

$$V2 = \left.\underbrace{\begin{bmatrix} 3 & 4 \end{bmatrix}}_{2 \text{ columns}}\right\}\ 1 \text{ row}$$

$$V3 = \left.\underbrace{\begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix}}_{1 \text{ column}}\right\}\ 3 \text{ rows}$$