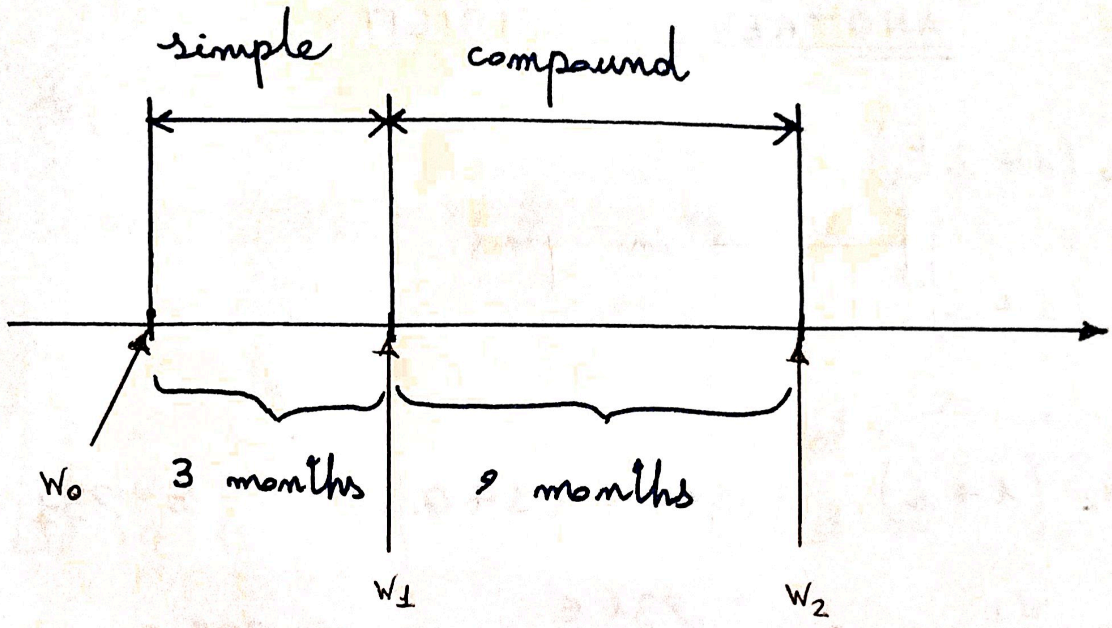

$i = 0.1$

simple: $i_{12}^{s} = \dfrac{i}{12} = \dfrac{0.1}{12} = 0.008\overline{3}$

compound: $i_{12}^{c} = (1+i)^{\frac{1}{12}} - 1 \approx 0.00797$

in months

$W_1 = W_0 \left(1 + i_{12}^{s}\, t_s\right)$

$W_2 = W_1 \left(1 + i_{12}^{c}\right)^{t_c}$ in months

$W_1 = W_2 \left(1 + i_{12}^{c}\right)^{-t_c} =$

$= 1000\,€ \left(1 + 0.00797\right)^{-9} \cong 931\,€$.

$W_0 = \dfrac{W_1}{1 + i_{12}^{s}\, t_s} = \dfrac{931.05\,€}{1 + 0.00833 \cdot 3} \approx 908\,€$.

ANOTHER POSSIBILITY

$$W_1 = W_0 (1 + i\, t_s)$$

in years

$$W_2 = W_1 (1+i)^{t_c}$$

$$W_1 = W_2 (1+i)^{-t_c} = 1000\,€\, (1+0.1)^{-\frac{9}{12}} \approx 931\,€$$

$$W_0 = \frac{W_1}{1 + i\, t_s} = \frac{931\,€}{1 + 0.1 \cdot \frac{3}{12}} \approx 908\,€$$

$$A = \begin{bmatrix} 1 & 6 \\ 5 & 2 \end{bmatrix}$$

$$\det(A - \lambda I) = 0$$

$$\begin{vmatrix} 1-\lambda & 6 \\ 5 & 2-\lambda \end{vmatrix} = 0$$

$$(1-\lambda)(2-\lambda) - 5 \cdot 6 = 0$$

$$(\lambda - 1)(\lambda - 2) - 30 = 0$$

$$\lambda^2 - 3\lambda + 2 - 30 = 0$$

$$\lambda^2 - 3\lambda - 28 = 0$$

$$(\lambda - 7)(\lambda + 4) = 0$$

$$\lambda = 7 \quad \vee \quad \lambda = -4$$

$$A v = \lambda v$$

$$(A - \lambda I) v = 0$$

$\underline{\lambda = 7}$

$$(A - 7I) v = 0$$

$$\begin{bmatrix} 1-7 & 6 \\ 5 & 2-7 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\begin{bmatrix} -6 & 6 \\ 5 & -5 \end{bmatrix} \sim \begin{bmatrix} -1 & 1 \\ 1 & -1 \end{bmatrix} \sim \begin{bmatrix} 1 & -1 \\ 0 & 0 \end{bmatrix}$$

$x - y = 0$; $x = y$

$v = (t, t)$, $t \in \mathbb{R}$

For example:

$$v = \left(\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}} \right)$$

$\underline{\lambda = -4}$

$(A + 4I) v = 0$

$$\begin{bmatrix} 1+4 & 6 \\ 5 & 2+4 \end{bmatrix} \sim \begin{bmatrix} 5 & 6 \\ 5 & 6 \end{bmatrix} \sim \begin{bmatrix} 5 & 6 \\ 0 & 0 \end{bmatrix}$$

$5x + 6y = 0$; $y = -\frac{5}{6}x$

For example: $v = (6, -5)$

$$f(x,y) = (8x^2 - 6xy + 3y^2)\, e^{2x+3y}$$

$$f'_x = (16x - 6y)\, e^{2x+3y} + (8x^2 - 6xy + 3y^2)\, 2e^{2x+3y} =$$

$$= 2(8x^2 - 6xy + 3y^2 + 8x - 3y)\, e^{2x+3y}$$

$$f'_y = (-6x + 6y)\, e^{2x+3y} + (8x^2 - 6xy + 3y^2)\, 3e^{2x+3y} =$$

$$= 3(8x^2 - 6xy + 3y^2 - 2x + 2y)\, e^{2x+3y}$$

$$\begin{cases} 2(8x^2 - 6xy + 3y^2 + 8x - 3y)\, e^{2x+3y} = 0 \\ 3(8x^2 - 6xy + 3y^2 - 2x + 2y)\, e^{2x+3y} = 0 \end{cases}$$

$$\begin{cases} 8x^2 - 6xy + 3y^2 + 8x - 3y = 0 \\ 8x^2 - 6xy + 3y^2 - 2x + 2y = 0 \end{cases} \ominus$$

$$10x - 5y = 0$$

$$\begin{cases} 8x^2 - 6xy + 3y^2 + 8x - 3y = 0 \\ y = 2x \end{cases}$$

$$8x^2 - \cancel{12x^2} + \cancel{12x^2} + 8x - 6x = 0$$

$$4x^2 + 4x - 3x = 0$$

$$4x^2 + x = 0$$

$$x(4x + 1) = 0$$

$$x = 0 \quad \vee \quad x = -\frac{1}{4}$$

$P(0,0)$; $Q\left(-\frac{1}{4}, -\frac{1}{2}\right)$

$$f''_{xx} = 4(8x^2 - 6xy + 3y^2 + 16x - 6y + 4)\,e^{2x+3y}$$

$$f''_{xy} = f''_{yx} = 6(8x^2 - 6xy + 3y^2 + 6x - y - 1)\,e^{2x+3y}$$

$$f''_{yy} = 3(24x^2 - 18xy + 9y^2 - 12x + 12y + 2)\,e^{2x+3y}$$

$$\underline{\underline{H}}_f(P) = \begin{pmatrix} 16 & -6 \\ -6 & 6 \end{pmatrix}$$

$f''_{xx}(P) = 16 > 0$

$\det \underline{\underline{H}}_f(P) = 60 > 0$

P is a relative minimum

$$\underline{\underline{H}}_f(Q) = \begin{bmatrix} 14\,e^{-2} & -9\,e^{-2} \\ -9\,e^{-2} & \frac{3}{2}\,e^{-2} \end{bmatrix}$$

$f''_{xx}(Q) > 0$

$\det \underline{\underline{H}}_f(Q) = -60\,e^{-4} < 0$

Q is a saddle point.