

Autre Méthode

$$x_K = m - (x_1 + x_2 + \dots + x_K)$$

$$U = \frac{\ln(\lambda x_1)}{x_1} + \dots + \frac{\ln(\lambda x_K)}{x_K} + \frac{1}{K} \ln(\lambda [m - (x_1 + x_2 + \dots + x_K)])$$

$$\max_{(x_1, \dots, x_K)} \frac{1}{K} \sum_{i=1}^K \ln(\lambda x_i)$$

$$\text{s.t. } m = x_1 + x_2 + \dots + x_K$$

TD 3

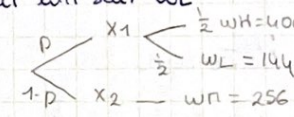
EXERCICE 3

a) $Lx_1 = (w_H, w_L; \frac{1}{2}, \frac{1}{2})$ $Lx_2 = (w_M; 1) \rightarrow$ eq certain

b) $E(L) = \frac{1}{2} \times 400 + \frac{1}{2} \times 200 = 300 > 280 \rightarrow$ averse au risque

c) $Lc = (\frac{p}{2}, \frac{p}{2}, 1-p; 400, 144, 256)$ $P = x_1 =$ soit w_H soit w_L

d) $U(x) = \sqrt{x}$ $E(U(x)) = \frac{p}{2} \times \sqrt{400} + \frac{p}{2} \sqrt{144} + (1-p) \sqrt{256}$



$$E(U(x)) = \frac{200}{2} + \frac{12p}{2} + (1-p)16 = 10p + 6p + 16 - 16p = 16$$

$\sqrt{x} = 16 \Rightarrow x = 16^2 \Rightarrow x = 256$ OR $256 = w_M \Rightarrow$ salaire certain
 On choisit x_2 car choisit pas $x_1 \rightarrow$ AVERSE au RISQUE
 car ya de l'incertitude, x_2 est certain, m'importe pas le risque

e) $E[U(x)] = \frac{p}{2} \times 400^2 + \frac{p}{2} \times 144^2 + (1-p) 256^2$

$E[U(x)] = 24832p + 65536 \rightarrow$ croissant en p donc goût pour risque.
 \rightarrow on se dirigera vers x_1

EXERCICE 4 :

a) Si X mentrie au risque alors il achete la voiture si:
 $E[w + 2000q - p] > E[w] \quad p \leq 2000E[q]$

OR $E[q] = \frac{1}{2} \times 2 + \frac{1}{2} \times 8 = 5 \quad p \leq 2000 \times 5 \leq 10000 \rightarrow$ prix achat si mentrie

b) $U(x) = \ln(x) \Leftrightarrow \frac{1}{2} \ln(w-p+2000 \times 2) + \frac{1}{2} \ln(w-p+2000 \times 8) = \ln(w)$

$\Leftrightarrow \frac{1}{2} \ln(100000 - p + 2000 \times 2) + \frac{1}{2} \ln(100000 - p + 2000 \times 8) = \ln(100000)$

$\Leftrightarrow \ln(104000 - p) + \ln(116000 - p) = 2 \ln(100000)$
 $\ln[(104000 - p)(116000 - p)] = \ln(100000)^2 \quad p^* \approx 9820$

c) prime = $10000 - 9820 = 180$

$\rightarrow 2064 - 116p + p^2 = 0$

$\rightarrow \Delta = -220^2 - 4(1)(2064)$

EXERCICE 5 $C_2 = (y_1 - c_1)(1+I)$

$$a) \begin{cases} \max & U(c_1) + E[U(c_2)] \\ \text{s.c.} & c_2 = (y_1 - c_1)(1+I) \end{cases} \quad * = U(c_1) + \sum_K p_K U((y_1 - c_1)(1+I_K))$$

$$b) \text{CPO } \frac{\partial [U(c_1) + E[U(c_2)]]}{\partial c_1} = U'(c_1) - \sum p_K U'((y_1 - c_1)(1+I_K)) = 0$$

$$[U(f(c))] = f'(x) U'(f(x))$$

$$c) \text{CSO } U''(c_1) + \sum_K p_K U''((y_1 - c_1)(1+I_K)) < 0$$

$$c) \Leftrightarrow U''(c) < 0 \quad \forall c$$

$$d) u(c) = \frac{c^{1-\delta}}{1-\delta} \quad \delta > 0 \quad \text{et } \delta \neq 1 \quad u'(c) = c^{-\delta}$$

$$c_1^{-\delta} = \sum_K p_K [(y_1 - y_1)(1+I_K)]^{-\delta}$$

$$e) c_1^{-\delta} = \sum_K p_K [(y_1 - y_1) (1 + \underbrace{\sum p_K I_K}_{E(I)})]^{-\delta}$$

f) Jensen : si f est concave $f(\sum_{i=1}^n \lambda_i x_i) \geq \sum_{i=1}^n \lambda_i f(x_i) \quad \forall \lambda_i \geq 0 \quad \forall x_i \in \mathbb{R}$

$$c) f(x) = x^{-\delta} \quad f'(x) = -\delta x^{-\delta-1} \quad f''(x) = \delta(1+\delta)x^{-(\delta+2)} > 0$$