TP 5

(1) Wilson det 5 $\rightarrow$ repeated selling

$\lambda = 600\,000 / yr = 2400 / d$ $\quad \lambda = \frac{n}{T}$ $\rightarrow$ demand per time unit

$c_p = 0,8$ €/d

$c_s = 0,1$ €/d

$c_e = 2500$ €

$$\tilde{n} = \sqrt{\frac{2 \lambda c_e}{c_s}} \sqrt{\frac{c_s + c_p}{c_p}} = 11\,618,95$$

$\hookrightarrow 11\,619$

$$\tilde{T}_s = \tilde{T} - \tilde{T}_p \rightarrow \tilde{T} = \tilde{T}_s + \tilde{T}_p$$

$$= \frac{\tilde{n}}{\lambda} = 4,84 \text{ d}$$

(2) Stock. 2 $\rightarrow$ storage cost

$c_s = 100$ €/m

$c_p = 75$ €/d $= 2250$/m

$\tilde{n}$ opt if

$$L(n-1) < \frac{c_p}{c_s + c_p} < L(n)$$

$$L(n) = P[\xi \leq n] + \left(n + \frac{1}{2}\right) \sum_{r=n+1}^{\infty} \frac{p_r}{r}$$

$L(0) = \ldots$

$L(1) = \ldots$

$\vdots$

TP5

(3) α, β, γ model

α: shortage probability

$$\alpha = P[\xi > s_\alpha]$$

$$\xi \sim \mathcal{N}(\underbrace{\lambda\tau}_{\text{mean}}, \underbrace{\sigma}_{\text{std}})$$

central-limit theorem: $\eta = \dfrac{\xi - \lambda\tau}{\sigma} \sim \mathcal{N}(0,1)$

$$P\left[\mathcal{N}(0,1) > \frac{s_\alpha - \lambda\tau}{\sigma}\right] = P[\mathcal{N}(0,1) > k] = \alpha$$

$\alpha = 10\%$ cas $k = 1,28$ (see Normal law table

$$\Rightarrow s_\alpha = \lambda\tau + k\sigma$$
$$= 40 + 1,28 . 15 = 59,2$$

(4) Wilson det 3

$$c_a = \begin{cases} \underbrace{100 €/ p}_{c_1} & 0 \leq n < 100 \\ \dfrac{10\,000 + (n-100)\,95}{n} & n \geq 100 \end{cases}$$

$c_l = 200 €$ $\quad\lambda = 60/m$ $\quad\alpha = 0,0005/d$
$= 0,015/m$

$$\Gamma_1(n) = c_l \frac{\lambda}{n} + \alpha\left(c_1 + \frac{c_l}{n}\right)\frac{n}{2} \Rightarrow \tilde{n}_1 = \sqrt{\frac{2c_l\lambda}{\alpha c_1}}$$

$$\Gamma_2(n) = c_l \frac{\lambda}{n} + \alpha\left(\frac{10\,000 + (n-100)\,95}{n} + \frac{c_l}{n}\right)\frac{n}{2}$$

↳ $\tilde{n}_2$ tq $\dfrac{d\Gamma_2(n)}{dn} = 0$

TP 5

(5) $\lambda = 7500 \, / yr$

$c_\ell = 650 \, €$

$$c_a = \begin{cases} 15 \, €/p & 0 \leq n < 2500 \quad \hookrightarrow a \\ 13 \, €/p & n \geq 2500 \end{cases}$$

$\alpha = 10\% / yr$

$$\tilde{n}_1 = \sqrt{\frac{2 c_\ell \lambda}{\alpha c_1}} = 2549{,}51$$

$$\tilde{n}_2 = \sqrt{\frac{2 c_\ell \lambda}{\alpha c_2}} = 2738{,}61$$

$$\tilde{n}_2 > a \quad \Rightarrow \quad \tilde{n} = \tilde{n}_2 = 2739$$

TP6

(1) $\lambda = 10 / tu$

$c_s = 5$ €$/p/tu$

$c_e = 1000$ €

- $\tilde{m}_1 = \sqrt{\dfrac{2\lambda c_e}{c_s}} = 63,245 \rightarrow 64$

$\tilde{T} = \dfrac{\tilde{m}_1}{\lambda} = 6,4 \; tu$

$\Gamma(\tilde{m}) = 316,227$

- $\lambda = 15$

$\tilde{m}_2 = 77,459$

$\tilde{T} = 5,164 \; tu$

$\Gamma(\tilde{m}_2) = 387,29$

$\Gamma|_{10}(m) \leq \Gamma|_{10}(\tilde{m}_1) + 100 \Leftrightarrow \dfrac{c_e \lambda_1}{m} + c_s \dfrac{m}{2} \leq 416,227$

$\Gamma|_{15}(m) \leq \Gamma|_{15}(\tilde{m}_2) + 100 \Leftrightarrow \dfrac{c_e \lambda_2}{m} + c_s \dfrac{m}{2} \leq 487,29$

$\Rightarrow \quad 38,255 \leq m \leq 137,37$

(2) NOT TO DO

TP6

(3) Wilson det 3

$$c_a = \begin{cases} 3000 \text{ €/p} & 0 \leq n \leq 100 \hookrightarrow a \\ 2900 \text{ €/p} & n > 100 \end{cases}$$

$c_e = 8000$ €

$\lambda = 60/m \Rightarrow 2/j$

$\alpha = 5.10^{-3}/j$

$$\hat{n}_1 = \sqrt{\frac{2 c_e \lambda}{\alpha c_1}} = 46{,}19$$

$$\tilde{n}_2 = \sqrt{\frac{2 c_e \lambda}{\alpha c_2}} = 46{,}98 < a \Rightarrow \text{absurd}$$

$\Gamma_2(a) < \Gamma_1(\tilde{n}_1)$ $\overset{?}{\text{ou}}$ $\Gamma_2(a) > \Gamma_1(\tilde{n}_1)$

$\hookrightarrow \tilde{n} = a$ $\hookrightarrow \hat{n} = \tilde{n}_1$

$\Gamma_1(\tilde{n}_1) = 712{,}82$

$\Rightarrow \tilde{n} = \tilde{n}_1 = 47$

$\Gamma_2(a) = 905$