Presse de découpage de cartons : Corrigé

1.1 Premier ordre $H_m(p) = \dfrac{K_m}{1+T_m p}$

$K_m = \dfrac{4,1}{1} = 4,1 \text{ rad.s}^{-1}.\text{V}^{-1}$

$63\% \times 4,1 = 2,583 \Rightarrow T = 2,7 \text{ s}$

$$\boxed{H_m(p) = \frac{4,1}{1+2,7p}}$$

1.2 $$\boxed{K_R = \frac{\omega_8}{\omega_m} = \frac{-z_9}{z_8} = -0,1 =}$$

$$\overrightarrow{V_{AE817}} = \overrightarrow{V_{AE810}} + \overrightarrow{V_{AE017}} = \frac{P_V}{2\pi}\left(\overrightarrow{\Omega_{810}} + \overrightarrow{\Omega_{017}}\right)$$

or $\overrightarrow{V_{AE810}} = \vec{0}$ et $\overrightarrow{\Omega_{017}} = \vec{0}$ et $\overrightarrow{V_{AE017}} = -\overrightarrow{V_{AE710}}$

$$\Rightarrow \overrightarrow{V_{AE710}} = -\frac{P_V}{2\pi}\overrightarrow{\Omega_{810}} = \overrightarrow{V_{BE710}}$$

$$\Rightarrow V_7 = -\frac{P_V}{2\pi}\omega_8 \Rightarrow \boxed{K_{VE} = \frac{-P_V}{2\pi}}$$

1.3 $$\overrightarrow{V_{BE617}} = \overrightarrow{V_{BE610}} + \overrightarrow{V_{BE017}} = \overrightarrow{V_{BE610}} - \overrightarrow{V_{BE710}}$$

$$= V_6 \vec{y}_0 - V_7 \vec{z}_0 = V_y \vec{z}_7 = -V_y \sin\alpha \vec{y}_0 + V_y \cos\alpha \vec{z}_0$$

$$\Rightarrow V_6 = -V_y \sin\alpha \qquad \Rightarrow \frac{V_6}{V_7} = \tan\alpha$$

$$-V_7 = +V_y \cos\alpha$$

$$\Rightarrow \boxed{K_{pi} = \tan\alpha}$$

$$K_{ad} = \frac{K_{cap}}{K_R K_{VE} V_{pi}} = \frac{66/2\pi}{0,1 \times \frac{P_V}{2\pi}\tan\alpha} = 3045 \text{ inc.mm}^{-1}$$

(2.1) $H_{BONC}(p) = \dfrac{835}{p(1+2,7p)}$

(2.2) $G_{dB\,BONC}(40) = 20\log 835 - 20\log 40 - 10\log(1+2,7^2 \times 40^2)$

$G_{dB\,BONC}(40) = -14,3\ dB$

$\varphi_{BONC}(40) = -90 - \arctan 2,7 \times 40 = -179,5°$

(2.3) $M_\varphi = 180 + \varphi_{cor}(40) + \varphi_{BONC}(40)$

$\varphi_{cor}(40) = M_\varphi - 180 - \varphi_{BONC}(40)$

$\varphi_{cor}(40) = 60° - 180° + 179,5° = 59,5°$

(2.4) $\varphi_{cor}(40) = \varphi_M \qquad a = \dfrac{1+\sin\varphi_M}{1-\sin\varphi_M} = \dfrac{1+\sin 59,5°}{1-\sin 59,5°} = 13,5$

$\omega_M = \dfrac{1}{T\sqrt{a}} \Rightarrow T = \dfrac{1}{\omega_M\sqrt{a}} = \dfrac{1}{40\sqrt{13,5}} = 6,8 \cdot 10^{-3}\ s$

$0 = G_{dB\,BONC}(\omega_{0dB}) + G_{dB\,Cor}(\omega_{0dB})$

$0 = G_{dB\,BONC}(\omega_{0dB}) + 20\log K_c + 10\log a$

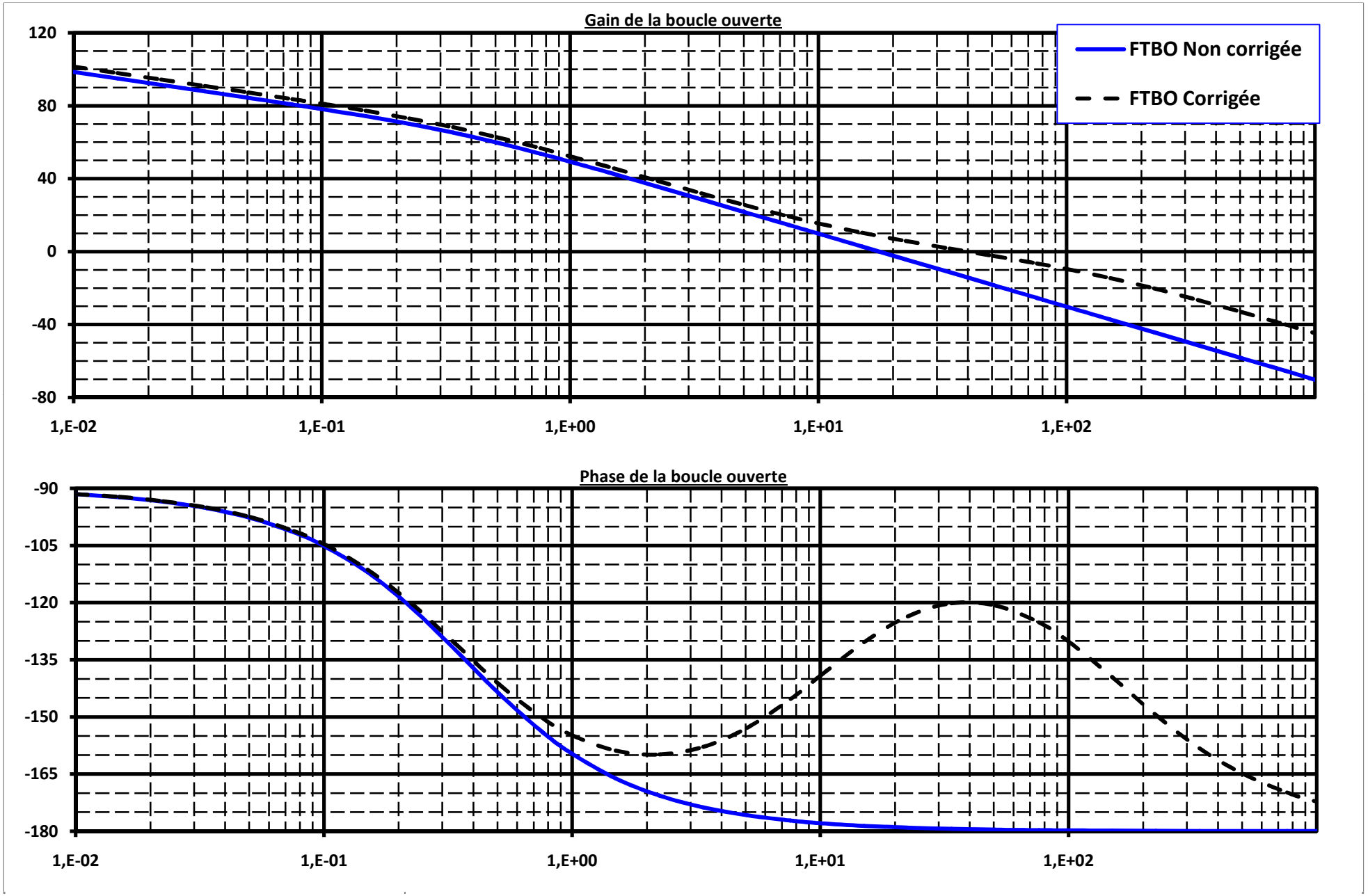
$\Rightarrow 20\log K_c = 14,3 - 10\log 13,5 = 3$

$\Rightarrow \boxed{K_c = 10^{3/20} = 1,41}$

(2.5) $D_{1\%} \approx 18\% < 20\% \qquad t_{5\%} \approx 0,14\ s < 0,3\ s$

$\varepsilon_s = 0$

$\Rightarrow$ C.d.C Verifiée.


Gain de la boucle ouverte
120
80
40
0
-40
-80
1,E-02
1,E-01
1,E+00
1,E+01
1,E+02
FTBO Non corrigée
FTBO Corrigée
Phase de la boucle ouverte
-90
-105
-120
-135
-150
-165
-180
1,E-02
1,E-01
1,E+00
1,E+01
1,E+02