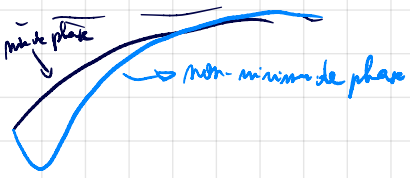
(A) Minimum de phase $C = (0\ 10)$.
↳ pas de zéros instables.



$$H(s) = C(sI - A)^{-1}D = \frac{9,353}{s^2 - 1,161s + 0,08853}$$ ← 2 pôles en boucle ouverte

$$C(s) = \frac{100}{PB}\left(1 + \frac{1}{s.T_i}\right)$$

$$T_{N\to y}(s) = \frac{H(s)}{1 + G(s)C(s)}$$ $H = s/(1 + G_{-s}C_{-s})$.

$C(s) = \frac{100}{PB}\left(\frac{sT_i + 1}{sT_i}\right)$.

$Zpk\left(\begin{bmatrix} z = -\frac{1}{T_i} & k = \frac{100}{PB} \\ p = 0 & \end{bmatrix}\right)$.

↳ on trouve les 3 pôles et on prend le + lent ↑ le + proche de l'axe imaginaire

donc $1 + G(s)C(s) = (s + 9,087)(s + \alpha)^2$ → temps de rép négligeable pour que pôle 0,087 soit dominant.
↳ $s^2 + 2\alpha s + \alpha^2$

Par identification

$$s^3 + (a_{11} + a_{22})s^2 + \left(a_{11}a_{22} - a_{21}a_{12} + \frac{10^3}{PB}ba_{21}\right)s + \frac{1000}{PBT_i}.ba_{21} = s^3 + (2\alpha + 9,087)s^2 + (2\alpha 9,087 + \alpha^2)s + 9,087\alpha^2.$$

$1 - 1$ ✓

$a_{11} + a_{22} = 2\alpha + 9,087$

$\frac{10^3}{PB}ba_{21} = 2\alpha 9,087 + \alpha^2 - a_{11}a_{22} + a_{21}a_{12}$

$\frac{1000}{PBT_i}ba_{21} = 9,087\alpha^2$

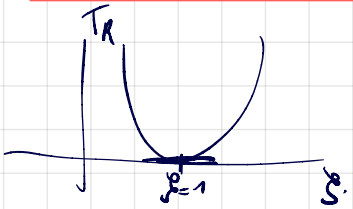
$$PB = \frac{1000\,ba_{21}}{2\alpha 9,087 + \alpha^2 - a_{11}a_{22} + a_{21}a_{12}} = 30,523$$ ↳ doc!

$\alpha = 0,53575$. ← doc!

$$T_i = \frac{1000\,ba_{21}}{PB\,9,087\alpha^2} = 11,4853\ s$$ → prof!

$\xi = 1$ → Vrai de réponse le + rapide.

Si $\xi < 1$, Vrai de réponse diminue si $\xi \nearrow$.



(B) Non-minimum de phase.

$T_N(s) = \frac{H(s)}{1 + G(s)C(s)}$ a 2 pôles instables donc ça plante.