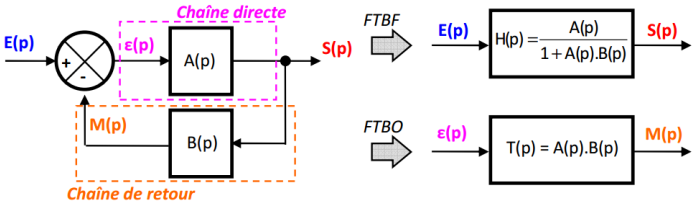
TD – Eolienne

POINT METHODE :

- FTBO (**Q3**) :



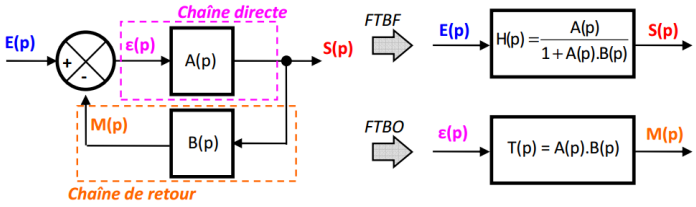
- Calcul de l'erreur (**Q4**) :

$$\varepsilon_s = \lim_{t\to\infty}(s(t) - e(t))$$

Théorème de la valeur finale

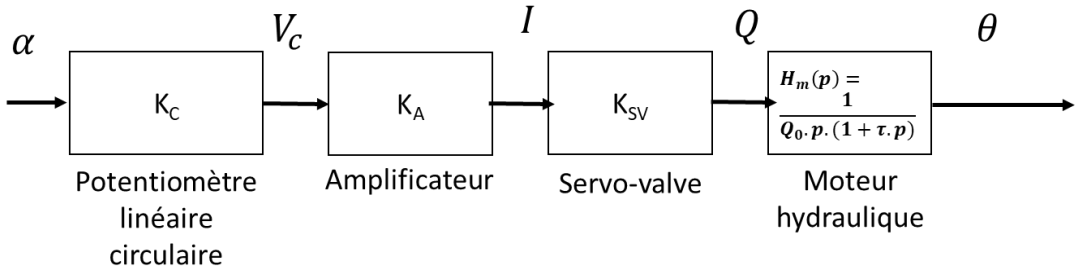
$$\lim_{t\to\infty} f(t) = \lim_{p\to 0^+} pF(p)$$

- FTBF (**Q6**) :



ELEMENTS DE CORRECTION :

Q1 :



Q2 :

$$FTBO(p) = \frac{\Theta(p)}{A(p)} = \frac{K_C.K_A.K_{SV}}{Q_0.p.(1+\tau.p)}$$

Q3 :

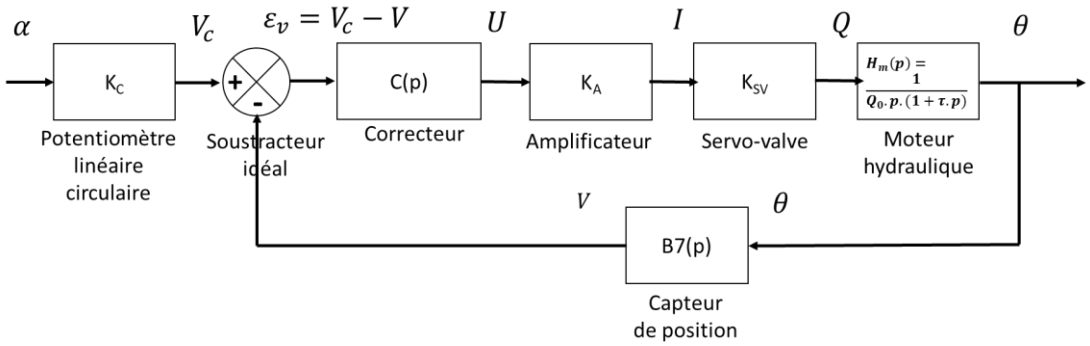
$$\varepsilon_p(p) = A(p).[1 - FTBO(p)]$$

Q4 :

$$\lim_{t\to\infty} \varepsilon_p(t) = -\infty \rightarrow erreur\ augmente\ au\ cours\ du\ temps$$

➔ Système asservi → réduire l'erreur

Q5 :



Q6 :

$$FTBF(p) = \frac{1}{1 + \frac{Q_0}{K_A.K_{SV}.K_C.C}.p + \frac{Q_0.\tau}{K_A.K_{SV}.K_C.C}.p^2}$$

Q7 :

$$\omega_0 = \sqrt{\frac{K_A.K_{SV}.K_C.C}{Q_0.\tau}} = 28{,}87\sqrt{C} \quad z = \frac{1}{2}.\sqrt{\frac{Q_0}{K_A.K_{SV}.K_C.C.\tau}} = \frac{0{,}017}{\sqrt{C}} \quad K = 1$$

Q8 :

Si C = 1

$\omega_0 = 28{,}87\ rad/s \quad z = 0{,}017$

Q9 :

Pour z = 0,7

C = $5{,}9.10^{-4}$

$\omega_0 = 0{,}70\ rad/s$

$t_{5\%} = 4{,}28\ s < 5\ s$ → OK CdCF

Pour z = 0,017

$t_{5\%} = 6{,}93\ s > 5\ s$ → ~~OK~~ CdCF