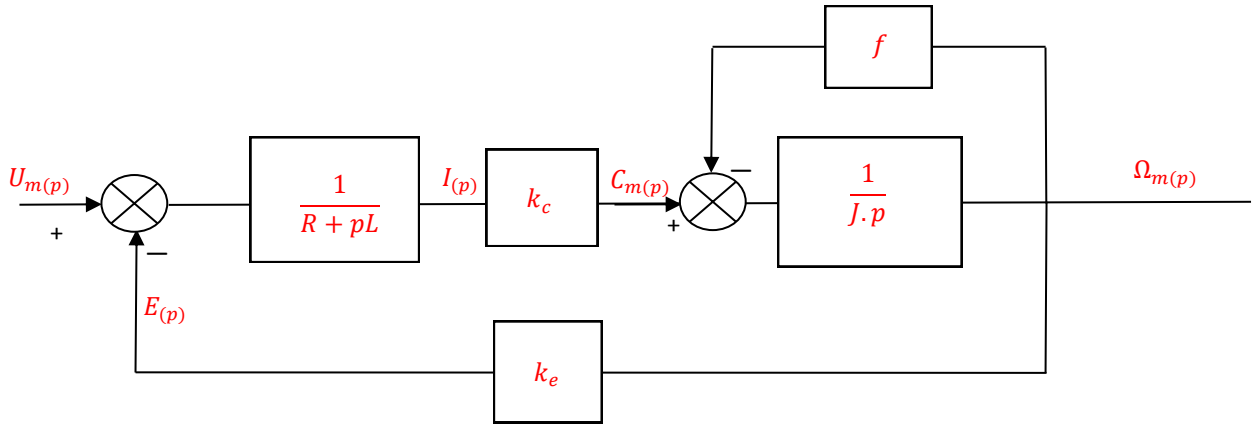
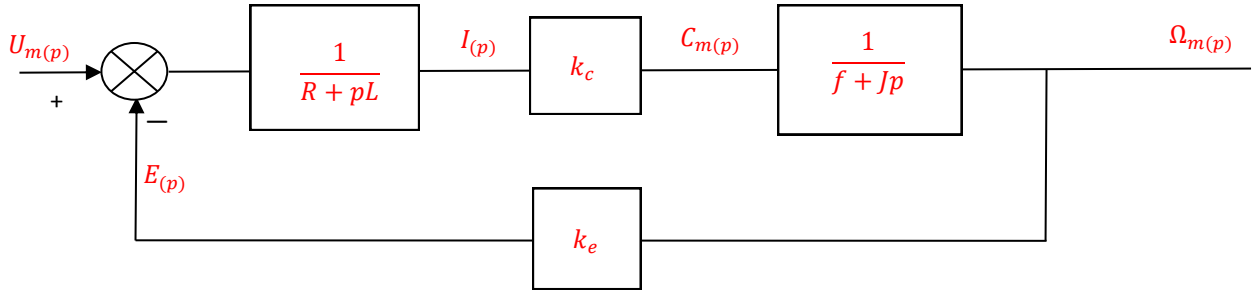
CORRIGE COMAX_A1_DR1

Q1



Q2



$$\Omega_{m(p)} = \frac{1}{Jp}.\left(C_{m(p)} - f.\Omega_{m(p)}\right) = \frac{C_{m(p)}}{Jp} - \frac{f}{Jp}.\Omega_{m(p)}$$

$$\Omega_{m(p)}.\left(1 + \frac{f}{Jp}\right) = \frac{C_{m(p)}}{Jp}$$

$$\Omega_{m(p)}.(Jp + f) = C_{m(p)}$$

$$\frac{\Omega_{m(p)}}{C_{m(p)}} = \frac{1}{(Jp+f)}$$

Q3

$$\Omega_{m(p)} = \frac{1}{Jp+f}.C_{m(p)} = \frac{1}{Jp+f}.k_c.\frac{1}{R+pL}.\left(U_{m(p)} - E_{(p)}\right) = \frac{k_c}{(Jp+f).(R+pL)}.\left(U_{m(p)} - k_e.\Omega_{m(p)}\right)$$

$$\Omega_{m(p)}.\left(1 + \frac{k_c.k_e}{(Jp+f).(R+pL)}\right) = \frac{k_c}{(Jp+f).(R+pL)}.U_{m(p)}$$

$$\Omega_{m(p)}.(Jp+f).(R+pL) + k_c.k_e) = k_c.U_{m(p)}$$

$$H_{m(p)} = \frac{\Omega_{m(p)}}{U_{m(p)}} = \frac{k_c}{(Jp+f).(R+pL) + k_c.k_e}$$

$$H_{m(p)} = \frac{k_c}{Rf + RJp + Lfp + Ljp^2 + k_c.k_e} = \frac{k_c}{(Rf + k_c.k_e) + (RJ + Lf)p + LJp^2}$$

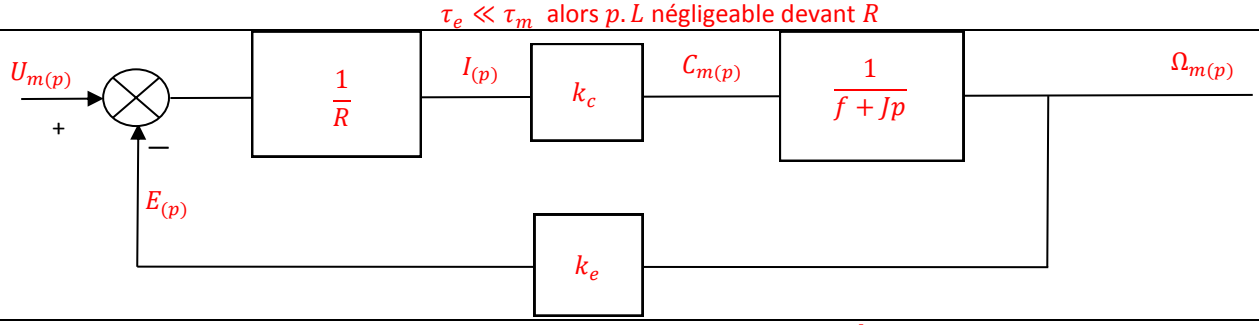
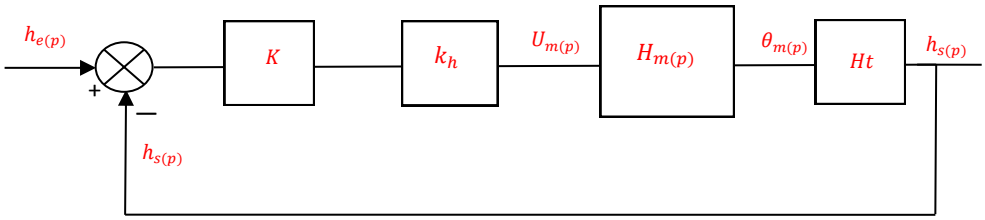
$$H_{m(p)} = \frac{\frac{k_c}{Rf + k_c.k_e}}{1 + \frac{RJ + Lf}{Rf + k_c.k_e}p + \frac{LJ}{Rf + k_c.k_e}p^2}$$

Q4

$$\tau_m.\tau_e = \frac{R.J}{k_e.k_t + R.f}.\frac{L}{R} = \frac{LJ}{Rf + k_c.k_e}$$

$$\frac{RJ + Lf}{Rf + k_c.k_e} = \frac{RJ}{Rf + k_c.k_e} + \frac{Lf}{Rf + k_c.k_e} = \tau_m + \alpha.\tau_e$$

avec $\alpha = \frac{Rf}{Rf + k_c.k_e}$

Q5	$k_e = 317 rpm/V$ $k_e = \frac{60}{317.2.\pi} = 30{,}124.10^{-3}\ V.s/rad$	$k_c = 30{,}2\ mNm/A$ $k_c = 30{,}2.10^{-3}\ Nm/A$	$k_c = k_e$ à 0,27 % près
Q6	$J = J_{rotor} + \frac{M.R^2}{r^2} = 142.10^{-7} + \frac{xxx.10^{-5}}{xxxx^2} = xxx\ 10^{-7}\ kg.m^2$		$J = xxxxx\ 10^{-7}\ kg.m^2$
Q7	$\tau_m = \frac{R.J}{k_e.k_t+R.f} = \frac{xxxx\ 10^{-7}}{xxxx.10^{-6}+xxx.10^{-6}} = xxxx\ ms$ $\quad \tau_e = \frac{L}{R} = \frac{xxxx.10^{-3}}{xxxx} = xxxx\ ms$ $\tau_e \ll \tau_m$ alors $p.L$ négligeable devant R		
Q8			
Q9	$H_{m(p)} = \frac{\frac{k_c}{Rf+k_c.k_e}}{1+\frac{RJ+Lf}{Rf+k_c.k_e}p+\frac{LJ}{Rf+k_c.k_e}p^2} = \frac{\frac{k}{Rf+k^2}}{1+\tau_m p} = \frac{H_{mo}}{1+\tau_m p}$		
Q10			
Q11			
Q12			