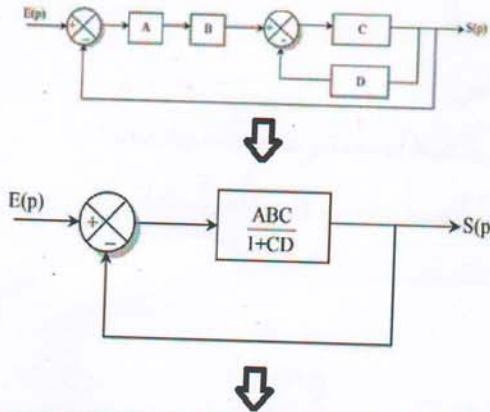


Exercice 1 (6pts)

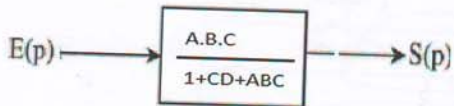
a) $L[f(t)] = F(p) = \frac{1}{p} - \frac{1}{p^3} - \frac{1}{p+2}$ b) $g(t) = L^{-1}\left(\frac{1}{p^2+4p+4}\right) = (te^{-2t})$

Exercice 2 (4pts)

1^{ère} transformation

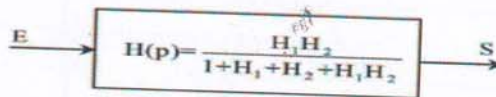


2^{ème} transformation



Exercice 3 (10pts)

1. Schéma blocs simplifié



2. $H(p) = \frac{H_1 H_2}{1 + H_1 + H_2 + H_1 H_2}$

3. Expression de fonction de transfert: $H(p) = \frac{1}{p^2+3p+2} = \frac{1}{p+1} - \frac{1}{p+2}$

4. $S_2(p) = \frac{1}{p^2(p^2+3p+2)} = -\frac{3}{4p} + \frac{1}{2p^2} + \frac{1}{p+1} - \frac{1}{4(p+2)}$

5. Valeurs initiales et finales de: $s_2(0)=0$; $s_2(+\infty)=+\infty$.

6. Expressions de: $s_2(t) = (-\frac{3}{4} + \frac{1}{2}t + e^{-t} - \frac{1}{4}e^{-2t})$