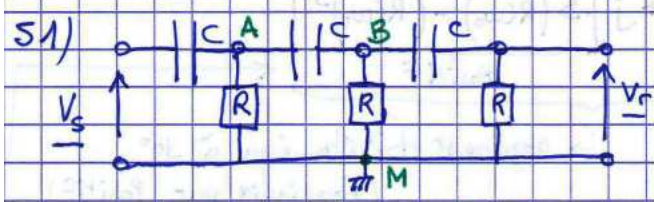
Exercice n°5

5.1)



- $\underline{Z_{BM}} = \underline{Z_R} // (\underline{Z_C} + \underline{Z_R}) = \dfrac{R \cdot \left(R + \frac{1}{jC\omega}\right)}{2R + \frac{1}{jC\omega}} = \dfrac{R(1+jR$
- $\underline{Z_{AM}} = \underline{Z_R} // (\underline{Z_C} + \underline{Z_{BM}})$

$$\Rightarrow \underline{Z_{AM}} = \frac{R \cdot \left(\frac{1}{jC\omega} + \underline{Z_{BM}}\right)}{R + \left(\frac{1}{jC\omega} + \underline{Z_{BM}}\right)} = \frac{R \cdot (1 + jC\omega\, \underline{Z_{BM}})}{1 + jC\omega\,(R + \underline{Z_{BM}})} = \frac{R \cdot \left(1 + \frac{jRC\omega(1+jRC\omega)}{1+j2RC\omega}\right)}{1 + jRC\omega + \frac{jRC\omega(1+jRC\omega)}{1+j2RC\omega}}$$

$$\Rightarrow \underline{Z_{AM}} = \frac{R \cdot (1 + j3RC\omega + (jRC\omega)^2)}{(1+jRC\omega) \cdot (1 + j3RC\omega)}$$

$$\underline{H}(j\omega) = \frac{\underline{V_r}}{\underline{V_s}} = \frac{\underline{V_r}}{\underline{V_B}} \cdot \frac{\underline{V_B}}{\underline{V_A}} \cdot \frac{\underline{V_A}}{\underline{V_s}} = \frac{R}{\left(R + \frac{1}{jC\omega}\right)} \cdot \frac{\underline{Z_{BM}}}{(\underline{Z_C} + \underline{Z_{BM}})} \cdot \frac{\underline{Z_{AM}}}{(\underline{Z_C} + \underline{Z_{AM}})}$$