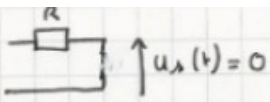
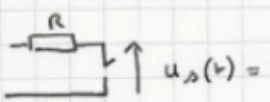


2. Filtre RL

- 1) En BF $L \Leftrightarrow$ — circuit \Leftrightarrow :  $u_s(t) = 0$
- En HF $L \Leftrightarrow$ / — circuit \Leftrightarrow :  $u_s(t) = u_e(t)$
- Le filtre est un filtre passe-haut.

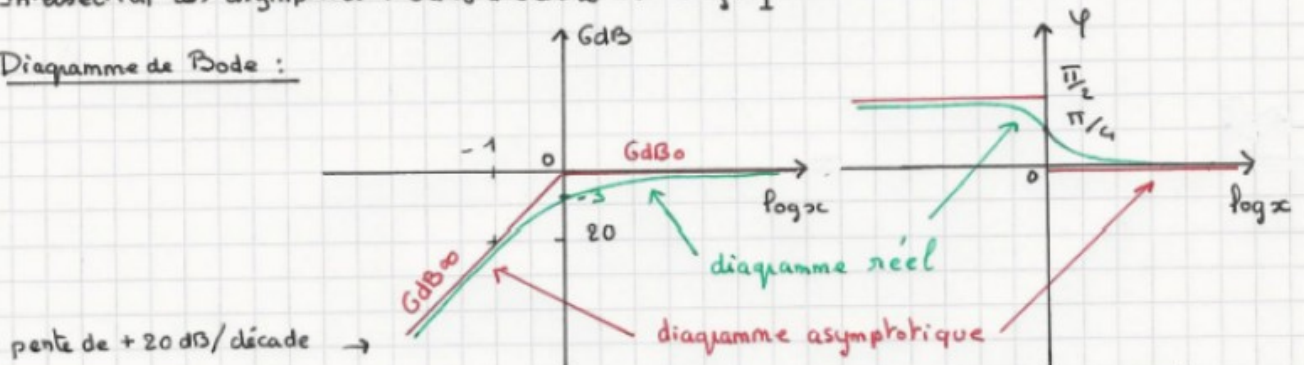
$$2) \underline{H} = \frac{Z_L}{R + Z_L} = \frac{j\omega L}{R + j\omega L} = \frac{j\omega L/R}{1 + j\omega L/R} = \frac{jx}{1 + jx} \quad \text{avec } x = \frac{\omega}{\omega_0} \text{ et } \omega_0 = \frac{R}{L}$$

3) Quand $x \rightarrow \infty$ $\underline{H}_\infty = 1 \Rightarrow GdB_\infty = 0$ et $\varphi_\infty = 0$

Quand $x \rightarrow 0$ $\underline{H}_0 = jx \Rightarrow GdB_0 = 20 \log x$ et $\varphi_0 = \frac{\pi}{2}$

Intersection des asymptotes : $GdB_0 = GdB_\infty \Rightarrow \log x_1 = 0$

Diagramme de Bode :



- 4) Pour tracer le diagramme de Bode réel, il faut déterminer x_c tq $H(x_c) = \frac{H_{\max}}{\sqrt{2}}$

$$H_{\max} = H_\infty = 1 \quad H(x_c) = \frac{x_c}{\sqrt{1+x_c^2}} = \frac{1}{\sqrt{2}} \Rightarrow 2 + 2x_c^2 = 1 + x_c^2 \Rightarrow x_c = 1$$

$$\underline{H}(jx_c) = \frac{j}{1+j} \Rightarrow \varphi(x_c) = \arg j - \arg(1+j) = \frac{\pi}{2} - \frac{\pi}{4} = \frac{\pi}{4}$$

5) $\frac{U_s}{U_e} = \frac{j\omega L}{R + j\omega L} \Rightarrow (R + j\omega L) U_s = j\omega L U_e \Rightarrow \boxed{u_s(t) + \frac{L}{R} \frac{du_s(t)}{dt} = \frac{L}{R} \frac{du_e(t)}{dt}}$