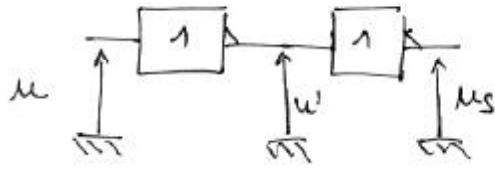
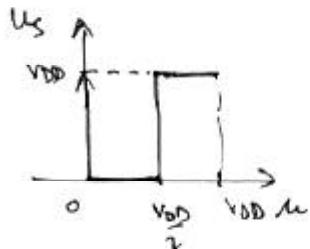
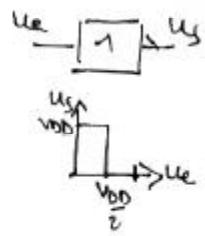


1) Caractéristique de transfert de 2 inverses:



$$\begin{aligned} * \mu < \frac{V_{DD}}{2} \Rightarrow \\ \mu' &= V_{DD} \\ \mu_s &= 0 \end{aligned}$$



$$\begin{aligned} * \mu > \frac{V_{DD}}{2} \Rightarrow \mu' = 0 \Rightarrow \mu_s = V_{DD} \\ \blacksquare \end{aligned}$$

2) Expression μ en fonction de u_e , u_s , R_1 et R_2 :

$$\mu = \frac{R_1}{R_1 + R_2} u_s + \frac{R_2}{R_1 + R_2} u_e$$

3) $u_s = 0$ et $u_e \uparrow$: $\mu = \frac{R_2}{R_1 + R_2} u_e \Rightarrow u_e = \left(1 + \frac{R_1}{R_2}\right) \mu$

$$u_e = \frac{V_{DD}}{2} \Rightarrow \boxed{U_2 = \left(1 + \frac{R_1}{R_2}\right) \frac{V_{DD}}{2}}$$

4) $u_s = V_{DD}$ et $u_e \downarrow$:

$$\mu = \frac{R_1}{R_1 + R_2} V_{DD} + \frac{R_2}{R_1 + R_2} u_e \Rightarrow u_e = \left(1 - \frac{R_1}{R_2}\right) \mu - \frac{R_1}{R_2} V_{DD}$$

$$u_e = \frac{V_{DD}}{2} \Rightarrow U_1 = \left(1 - \frac{R_1}{R_2}\right) \frac{V_{DD}}{2} - \frac{R_1}{R_2} V_{DD}$$

$$\boxed{U_1 = \frac{V_{DD}}{2} \left(1 - \frac{R_1}{R_2}\right)}$$

5) Calcul de ΔU :

$$\boxed{\Delta U = U_2 - U_1 = \frac{V_{DD}}{2} \left[1 + \frac{R_1}{R_2} - 1 - \frac{R_1}{R_2}\right] = \frac{R_1}{R_2} V_{DD}}$$

6) Centre du cycle $U_C = \frac{U_1 + U_2}{2} = \frac{V_{DD}}{2}$