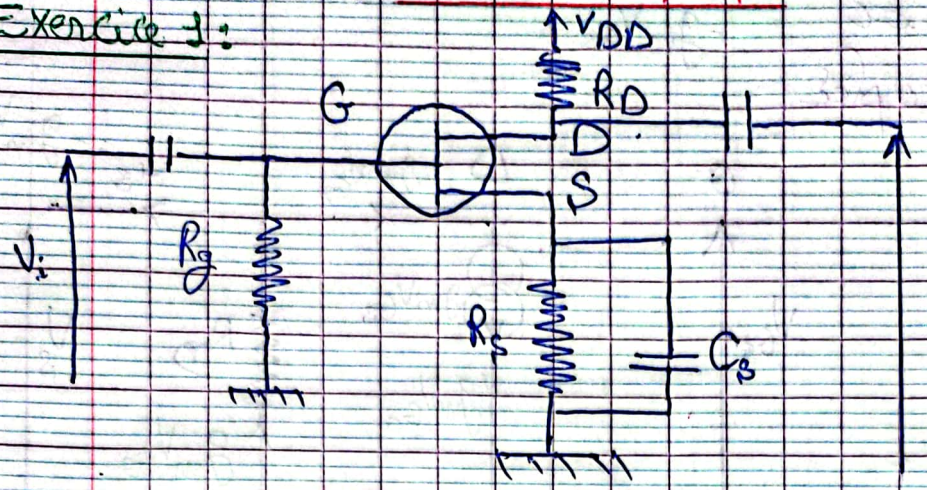
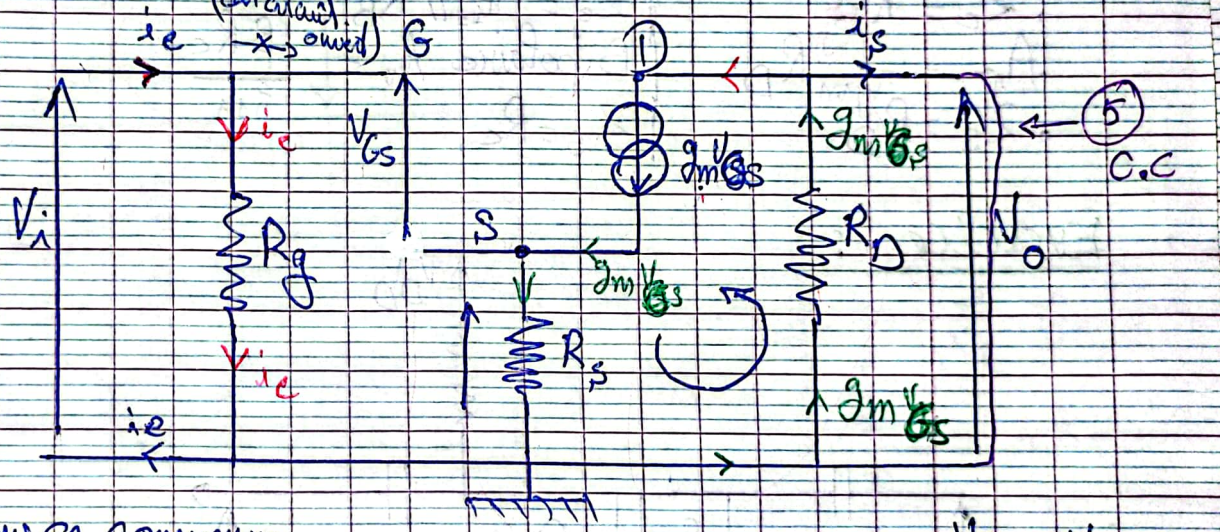
Série TD N°3

Exercice 1 :



1- Montage équivalent en régime dynamique

*R_s non découplée :



2- à source commune.

3- $Z_e = \frac{V_e}{i_e} = \frac{V_e}{\frac{V_e}{R_g}} = R_g$

$V_s \leftrightarrow V_0$

$V_e \leftrightarrow V_i$

SC

$Z_e = R_g$

4- $A_V = \frac{V_s}{V_e}$; $V_s = -g_m V_{GS} \times R_D$

V_e en fct de $g_m V_{GS}$?? $\Rightarrow V_e = V_{GS} + R_s g_m V_{GS}$

$$A_V = \frac{-g_m V_{GS} \times R_D}{V_{GS} + R_s g_m V_{GS}}$$

$$A_V = \frac{-g_m R_D}{1 + R_s g_m}$$ SC

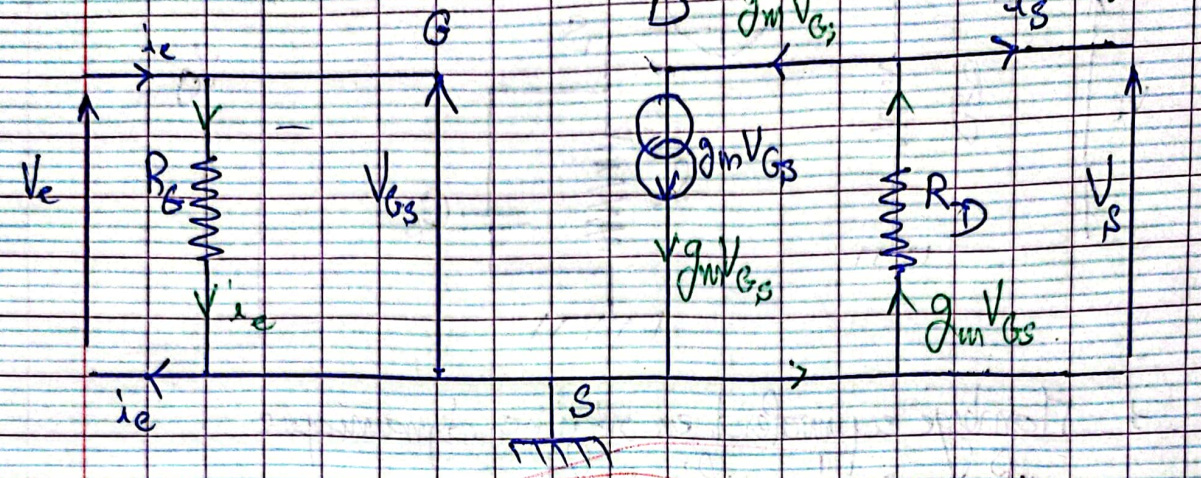
(1)

$\frac{V_s}{i_s}$ C.O C.C

SC : $\frac{g_m R_D}{1 + R_s g_m}$; OC : $\frac{1 + g_m R_D}{R_g + (1 + g_m) R_D}$

5- $Z_s = \frac{V_s \text{ c.o}}{i_s \text{ c.c}} = \frac{-g_m V_{GS} \times R_D}{-g_m V_{GS}} = R_D$

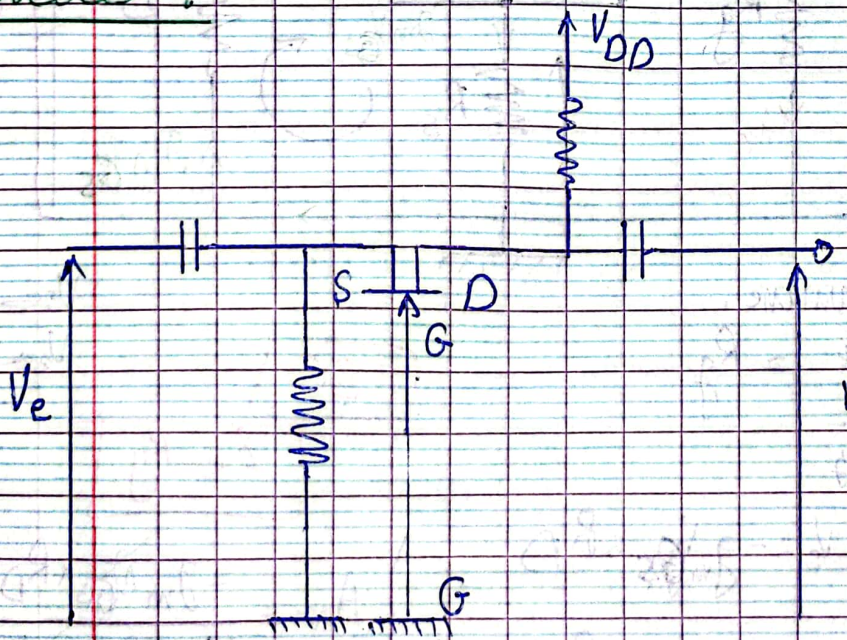
6- * R_S découplée :

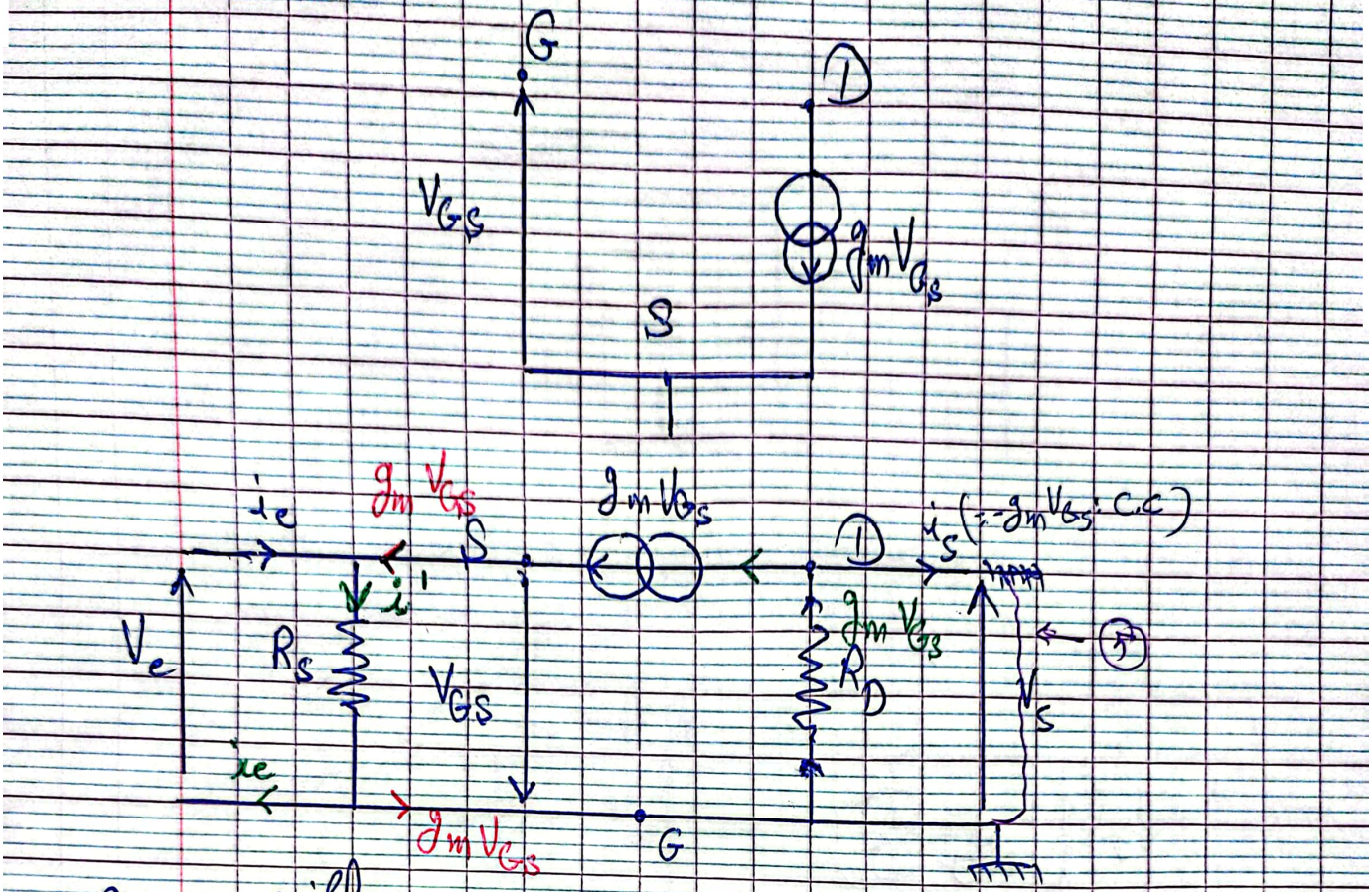


- $Z_e = R_G$
- $A_v = -g_m R_D$
- $Z_s = R_D$

$Z_e = h_{11} // R_B$
Bipolaire $A_v = \frac{-\beta R_c}{h_{11}}$
$Z_s = R_c$

Exercice :





-2- à grille commune

-3- $Z_e = \frac{V_e}{i_e} = R_S // \frac{V_e}{i_e + g_m V_{GS} R_S} = \frac{V_e}{i' - g_m V_{GS}} = \frac{1}{\frac{i'}{V_e} - g_m \frac{V_{GS}}{V_e}}$

$A_V = \frac{V_s}{V_e} // \left(\frac{V_{GS}}{V_e} = -1 \right)$

$= \frac{1}{\frac{1}{R_S} + g_m} = R_S // \frac{1}{g_m}$

-4- $A_V = \frac{V_s}{V_e}$; $\begin{cases} V_s = -g_m V_{GS} R_D \\ V_e = -V_{GS} \end{cases}$

$\Rightarrow A_V = g_m R_D$

-5- $Z_S = \frac{V_s \text{ C.O}}{i_s \text{ C.C}} = \frac{-g_m V_{GS} R_D}{-g_m V_{GS}} = R_D$

-6- on ne peut pas découpler R_S