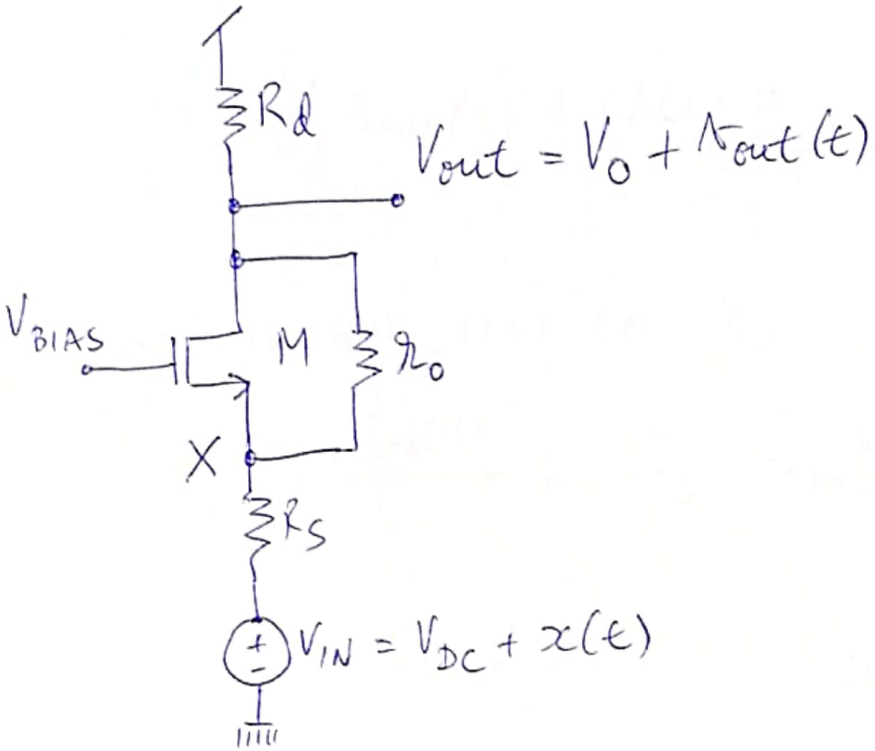
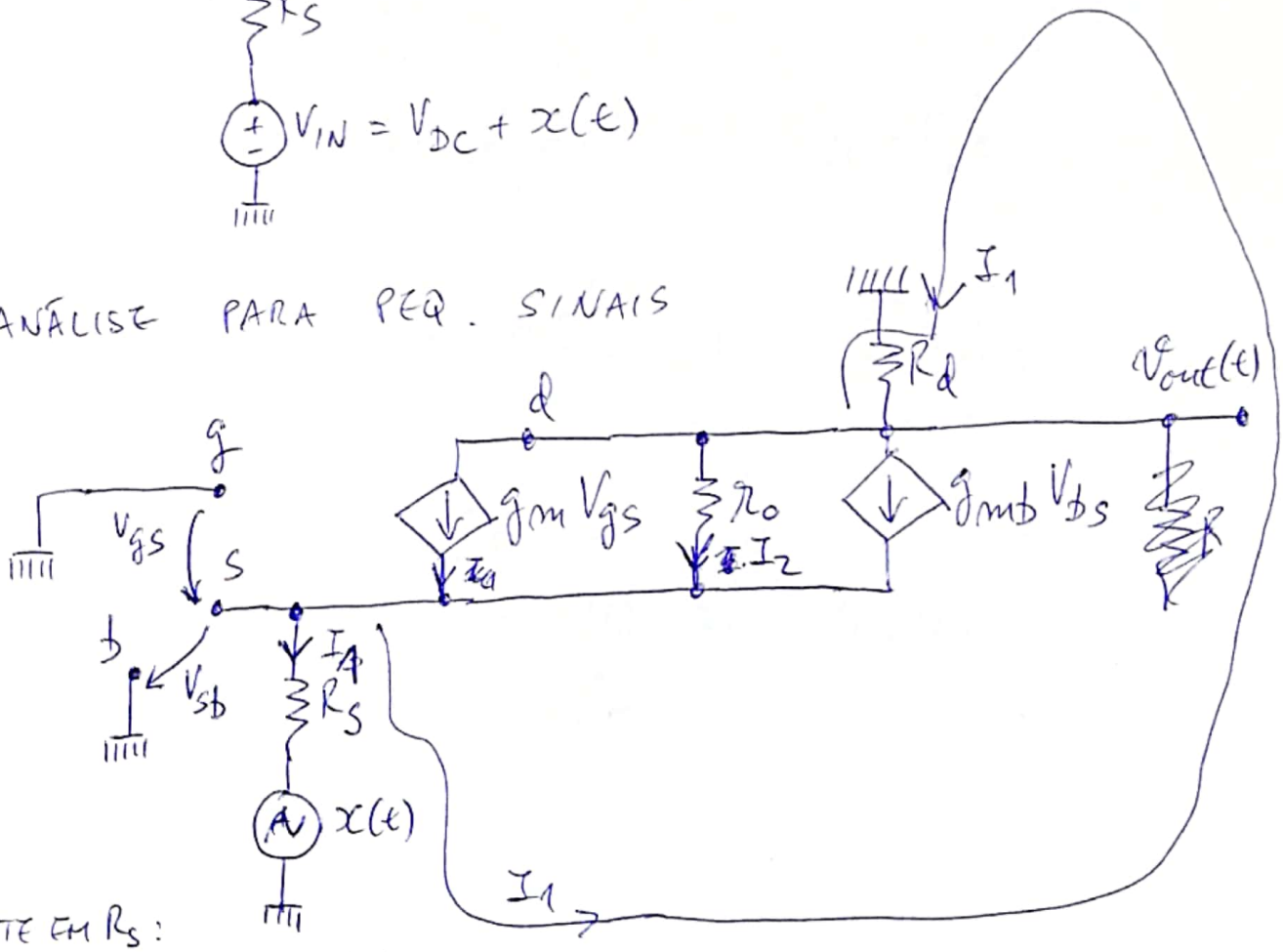
C6 AMPL. NUMA SITUAÇÃO MAIS GERAL

(±) CONSIDERA:
- RES. DA FONTE SINAL, R_S
- RES. DE SAÍDA DO MOSFET, R_o

(2) ESQUEMA

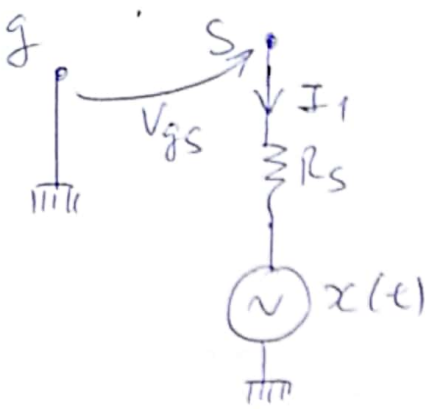


(3) ANÁLISE PARA PEQ. SINAIS



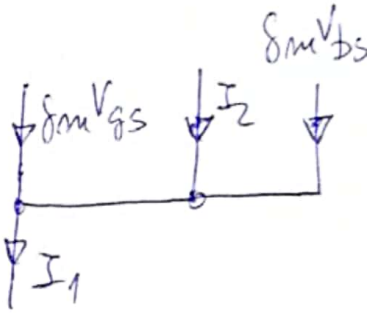
CORRENTE EM R_S:

$$I_1 = -\frac{v_{out}(t)}{R_d}$$



$$V_{gs} + R_S I_1 + x(t) = 0$$

$$V_{gs} - \frac{R_S}{R_d} v_{out}(t) + x(t) = 0$$



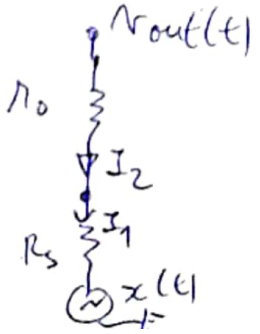
I_2 : CORRENTE QUE FLUI EM r_o

$$I_2 = -\frac{v_{out}(t)}{R_d} - g_m V_{gs} - g_{mb} V_{bs}$$

COMO $V_b = V_g = 0\ V \Rightarrow V_{bs} = V_{gs}$

$$\Rightarrow I_2 = -\frac{v_{out}(t)}{R_d} - g_m V_{gs} - g_{mb} V_{gs}$$

$$\Rightarrow r_o I_2 - \frac{R_S}{R_d} v_{out}(t) + x(t) = v_{out}(t) + R_S I_1$$



$$r_o\left[-\frac{v_{out}(t)}{R_d}-(g_m+g_{mb})\underbrace{\left(\frac{R_S}{R_d}v_{out}(t)-x(t)\right)}_{V_{gs}}\right]+$$

$$\underbrace{-\frac{R_S}{R_d}v_{out}(t)}_{R_S I_1}+x(t)=v_{out}(t)$$

$$\Rightarrow \quad A_v=\frac{v_{out}(t)}{x_i(t)}=\frac{\left[r_o(g_m+g_{mb})+1\right]R_d}{r_o\left[1+(g_m+g_{mb})R_S\right]+R_S+R_d}$$