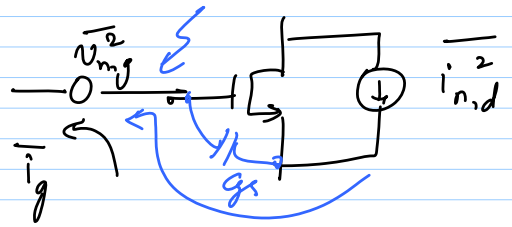
28-8-13

Lec 11

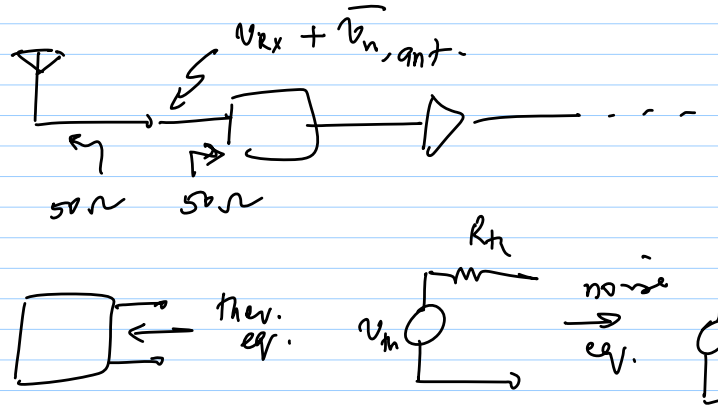


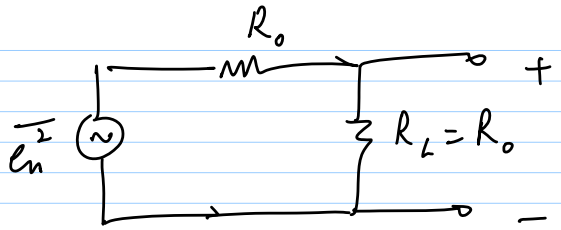
$\overline{i_{ng}^2}$ = gate induced noise

* part of it is correlated with $\overline{i_{n,d}^2}$

* freq. dependent

*





Noise power delivered to load resistor in a 1Hz BW

$$\frac{(\overline{e_n}/2)^2}{R_o} = \frac{\overline{e_n^2}}{4R_o} \quad (W/Hz)$$

$$= \frac{4kTR_o}{4R_o} = kT \quad (W/Hz)$$

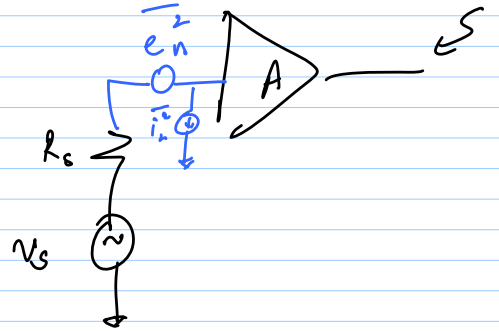
BW of operation = B

available noise power = kTB Watts

* function of BW ← do not overdesign
* " of T

Noise Factor 'F'

$$F \equiv \frac{\text{total output noise power}}{\text{output noise power due to the source alone}}$$



$A^2 v_s^2$ signal power

$A^2 \cdot \overline{v_{n,R_s}^2}$ output noise due to source

$A^2 \overline{e_n^2}$ output noise due to ampl.

$$F = \frac{A^2 \cdot \overline{v_{n,R_s}^2} + A^2 \overline{e_n^2}}{A^2 \cdot \overline{v_{n,R_s}^2}}$$

F(ideal amp.) = 1

* F is a measure of degradation of SNR

$$F \equiv \frac{SNR_{in}}{SNR_{out}}$$

* Noise Figure 'NF' in dB

$$NF = 10 \log(F) \text{ in dB}$$