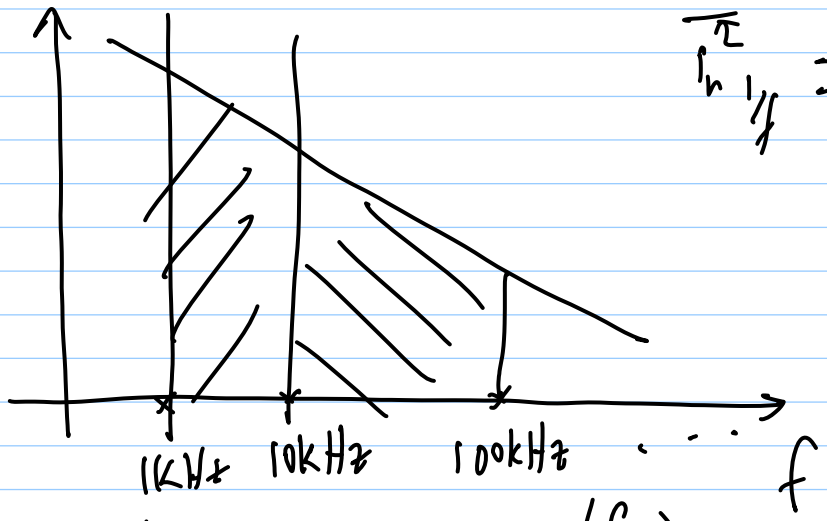
29-1-2013

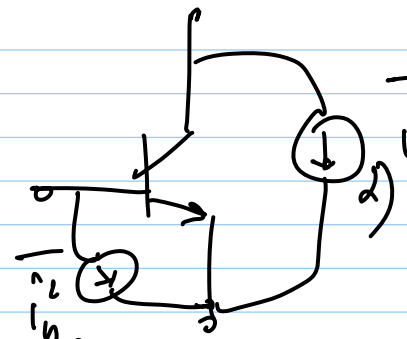
Lec 9

$\overline{i_{n\,1/f}^2}$



$$\overline{i_{n\,1/f}^2} = \frac{K_1}{f}\Delta f$$

$$\overline{i_{n\,1/f}^2}\Big|_{integ.} = K_1 \ln\left(\frac{f_2}{f_1}\right)$$

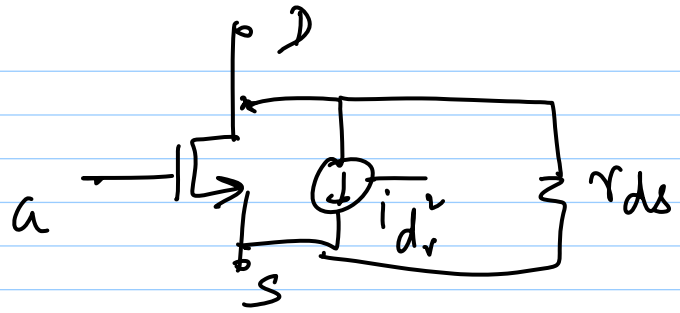


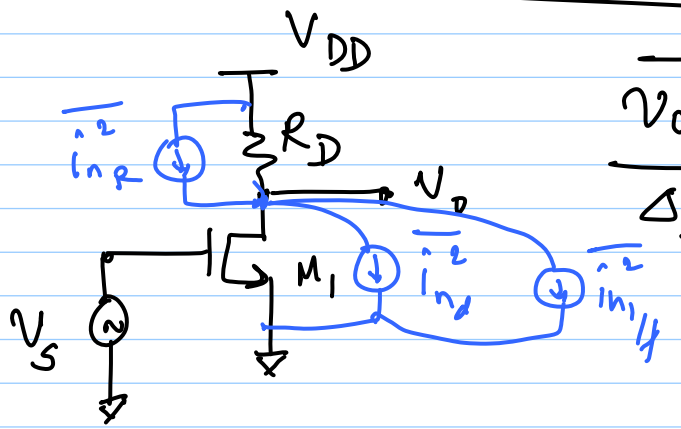
1) $\overline{i_{B_n}^2} = 2qI_B\Delta f$

2) $\overline{i_{C_n}^2} = 2qI_C\Delta f$

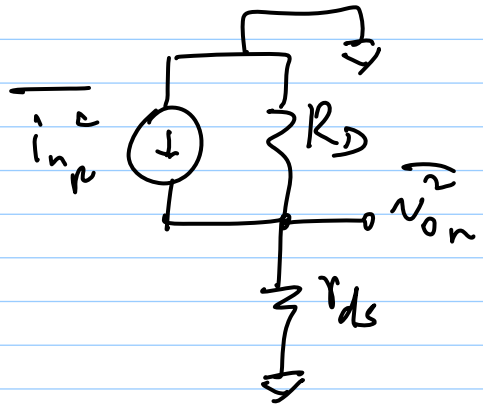
3) $\overline{i_{n\,1/f}^2}$

4) parasitic resistances R_B, R_C, R_E





$$\frac{\overline{v_{o_n}^2}}{\Delta f}$$

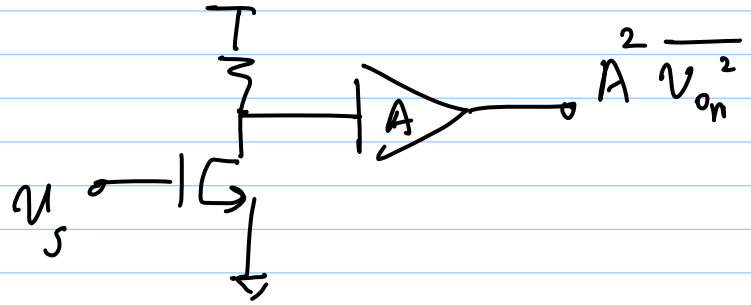


1) R_D : $\underline{4kT R_D}$

2) $\overline{i_{n_d}^2}$: $\frac{8kT}{3} g_m \times R_D^2$

3) $\overline{i_{n_{1/f}}^2}$: $\frac{K_1}{f} \cdot R_D^2$

$$\frac{\overline{v_{o_n}^2}}{\Delta f} = 4kTR_D + \frac{8kT}{3} g_m R_D^2 + \frac{K_1}{f} \cdot R_D^2$$

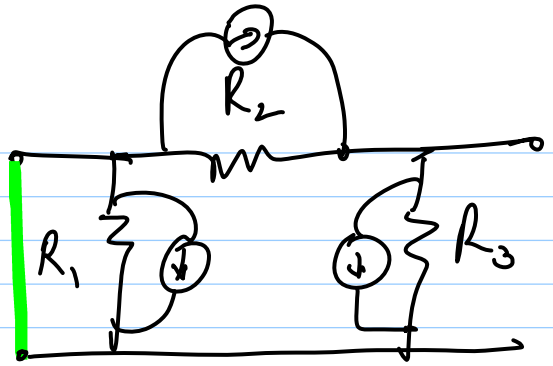


* Refer noise to input
→ use to characterize noise performance
"input-referred" noise of ckt

* fictitious sources

* $\overline{e_n}$ & $\overline{i_n}$ could be correlated

(1)



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(2)