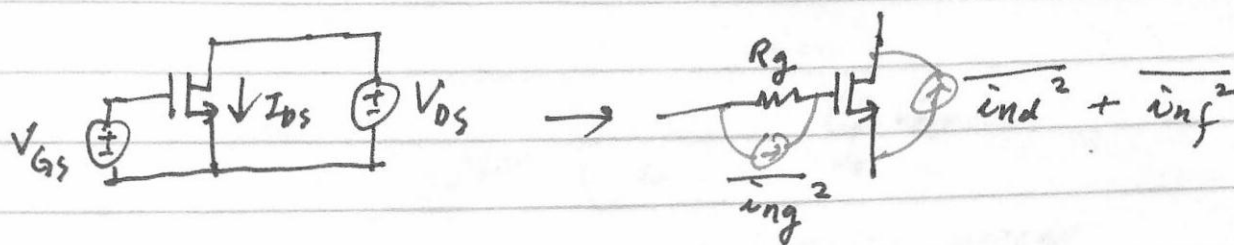


NA design

* Mos Noise Model

In the noise analysis part, we developed this noise model.



$$① \quad \overline{i_{ng}^2} = \frac{4KT \Delta f}{R_g}$$

$$② \quad \overline{i_{nd}^2} = 4KT \gamma g_m \Delta f$$

$$= 4KT \gamma g_{do} \Delta f$$

more exact expression

$\gamma = \frac{2}{3}$ for long channel
 $\gamma \sim 4$ for short channel

- γ : drain thermal noise coefficient
- for long channel $\Rightarrow g_{do} = g_m$
- for short channel $\Rightarrow g_{do} = g_m / \alpha$

$$③ \quad \overline{i_{nf}^2} \approx \frac{K_s}{W \cdot L \cdot C_{ox}} \cdot \frac{g_m^2}{f} \Delta f$$

(Let's ignore this flicker noise in ^{this} LNA designs)