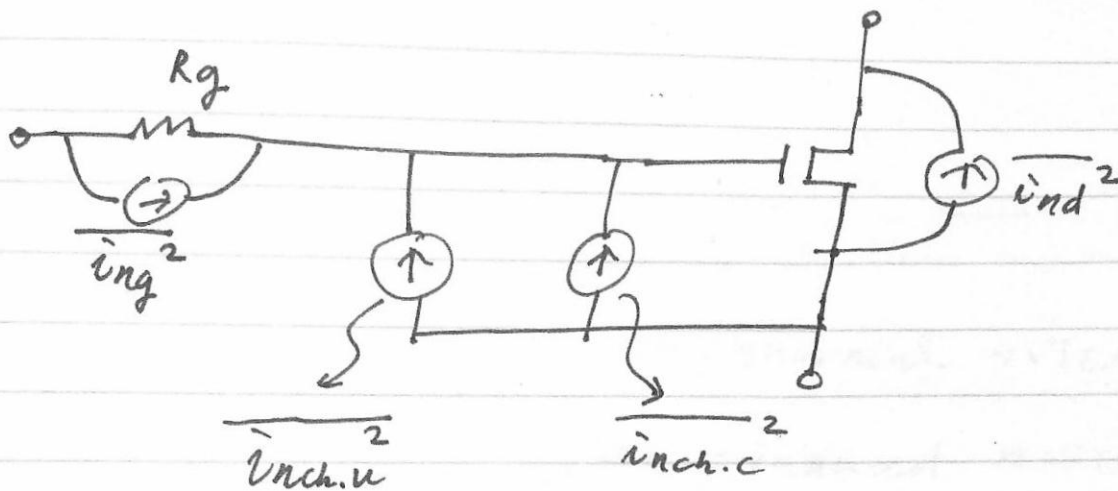


complete MOS noise model for LNA design



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

$$② \overline{i_{nd}^2} = 4KT r_{gdo} \Delta f = 4KT \frac{r}{\alpha} g_m \Delta f$$

$$③ \overline{i_{nch,u}^2} = 4KT \delta g_g (1 - |C|^2) \Delta f$$

$$④ \overline{i_{nch,c}^2} = 4KT \delta g_g |C|^2 \Delta f$$

where $g_g = \frac{\omega^2 C_{gs}^2}{5 g_{do}} = \alpha \frac{\omega^2 C_{gs}^2}{5 g_m}$

$$C \approx j0.395 \approx j0.4$$

r : drain noise coefficient

δ : induced gate noise coefficient ($\approx 2r$)

α : $g_m/g_{do} \approx 0.8$ for short channel
1 for long channel

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