② Computing $\overline{i_{neq}}$ ⇒ open input node.

From original circuit, output noise current is

$$\overline{i_{on}} = \overline{i_{nd}} \quad -(A)$$

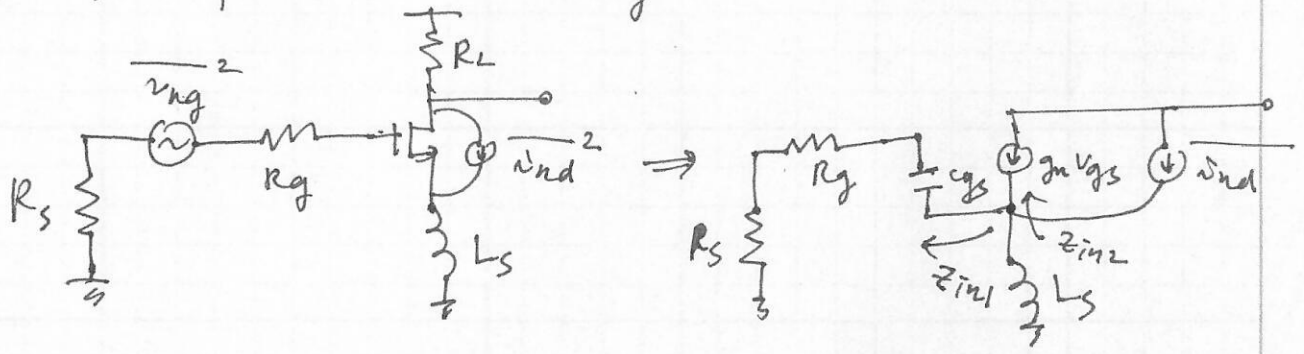
From model, output noise current is

$$\overline{i_{on}} = \overline{i_{neq}} \cdot \frac{1}{sC_{gs}} \cdot g_m \quad -(B)$$

⇒ From (A) and (B)

$$\overline{i_{neq}} = \overline{i_{nd}} \cdot \frac{sC_{gs}}{g_m} = \overline{i_{nd}} \frac{j\omega C_{gs}}{g_m}$$

2) Input referred noise voltage



From equivalent circuit shown in right side,

$$Z_{in1} = \frac{1}{sC_{gs}} + R_g + R_s \simeq \frac{1}{sC_{gs}} + R_s$$

$$Z_{in2} = \frac{\frac{1}{sC_{gs}} + R_s + R_g}{\frac{g_m}{sC_{gs}}} \simeq \frac{1 + sC_{gs}R_s}{g_m}$$

⇒ Output noise current due to $\overline{i_{nd}}$ is

$$i_{no}\Big|_{\text{due to } \overline{i_{nd}}} = \frac{Z_{in2}}{Z_{in1} /\!/ sL_s + Z_{in2}} \cdot \overline{i_{nd}}$$