⊛ Component of F due to correlated noise of $\overline{i_g}$ to $\overline{i_d}$

$$\overline{V_s^2} = 4KTR_s\,\Delta f$$

$$\overline{V_g^2} = 4KTR_g\,\Delta f$$

$$\overline{i_d^2} = 4KT\frac{r}{\alpha}g_m\,\Delta f$$

$$\overline{i_g^2} = 4KT\,\delta\,g_g\,\Delta f$$

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

$$\sqrt{\overline{i_g^2}\cdot\overline{i_d^2}} = 4KT\sqrt{\frac{\delta r}{\alpha}g_m\,\alpha\frac{1}{5g_m}}\cdot wC_{gs}\cdot\Delta f$$

$$= 4KTwC_{gs}\sqrt{\frac{\delta\cdot r}{5}}\cdot\Delta f$$

$\Rightarrow$ correlated noise

$$= \left(\frac{w_T}{jw}\right)\left(4KTwC_{gs}\sqrt{\frac{\delta r}{5}}\right)\cdot\frac{c}{2}\,\Delta f$$

$\Rightarrow$ component of F due to correlated noise

$$= \frac{\left(\frac{w_T}{jw}\right)4KTwC_{gs}\sqrt{\frac{\delta\cdot r}{5}}\cdot\frac{c}{2}\cdot\Delta f}{\frac{1}{4R_s^2}\left(\frac{w_T}{w}\right)^2\cdot 4KTR_s\cdot\Delta f}$$

$$= \left(\frac{w}{jw_T}\right)2CR_swC_{gs}\sqrt{\frac{\delta\cdot r}{5}}$$

$$= \boxed{\left(\frac{w}{w_T}\right)2|C|\frac{1}{2Q}\sqrt{\frac{\delta\cdot r}{5}}}$$

$\Rightarrow$ F | due to correlated $\overline{i_g}$

$$= \frac{|C|}{Q}\left(\frac{w}{w_T}\right)\sqrt{\frac{\delta\cdot r}{5}}$$