

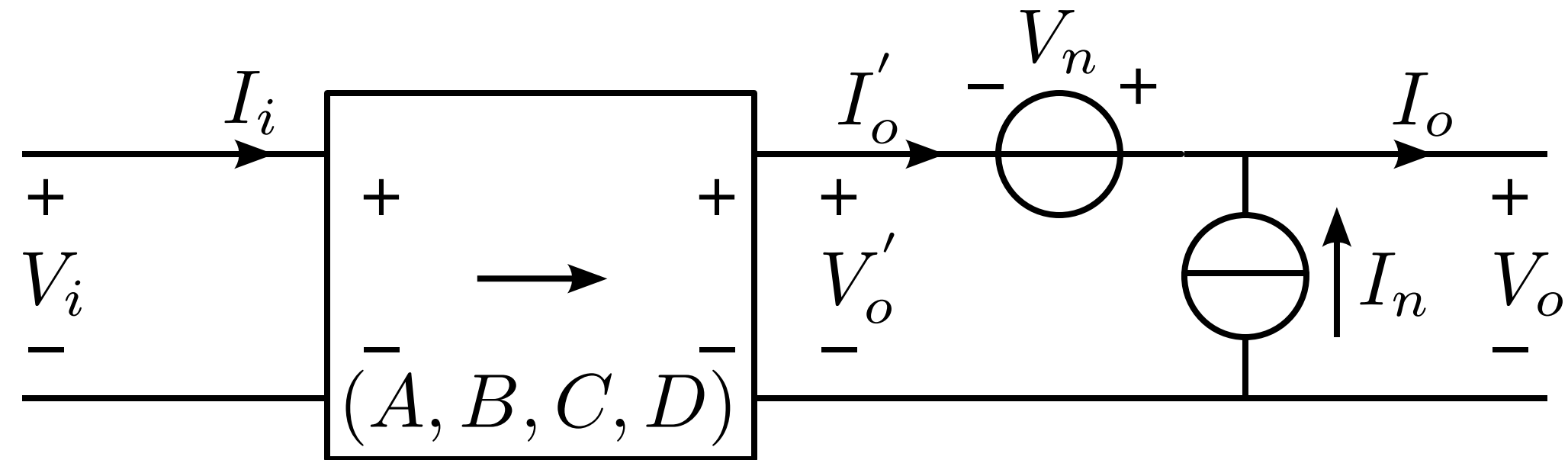
Structured Electronic Design

Intrinsic CS stage:
Equivalent-input noise sources

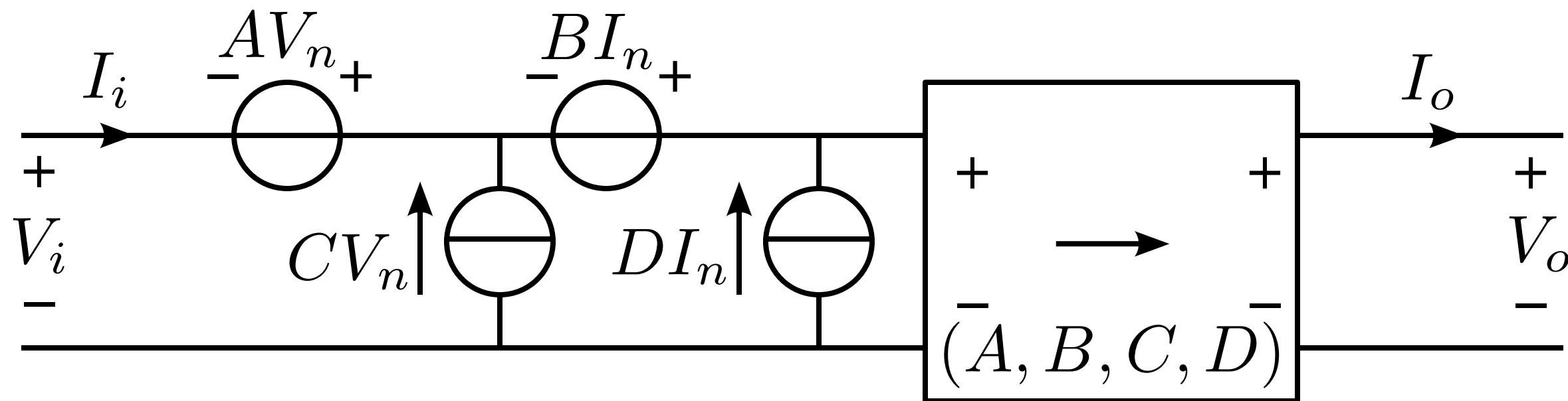
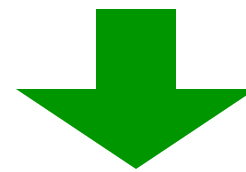
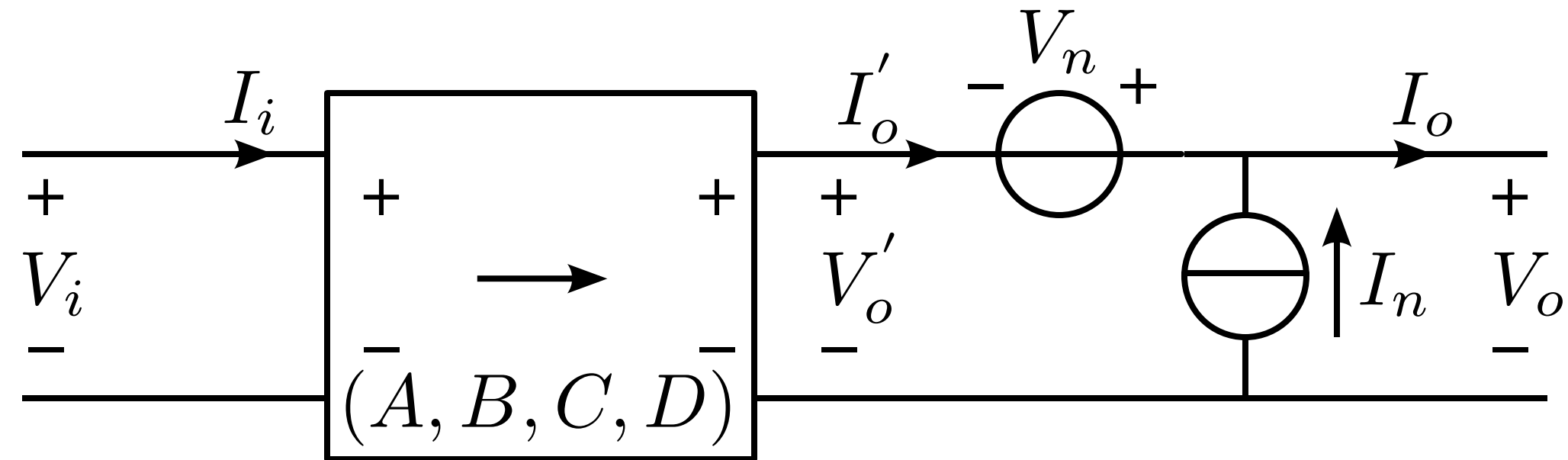
Anton J.M. Montagne

Two-port noise transformations

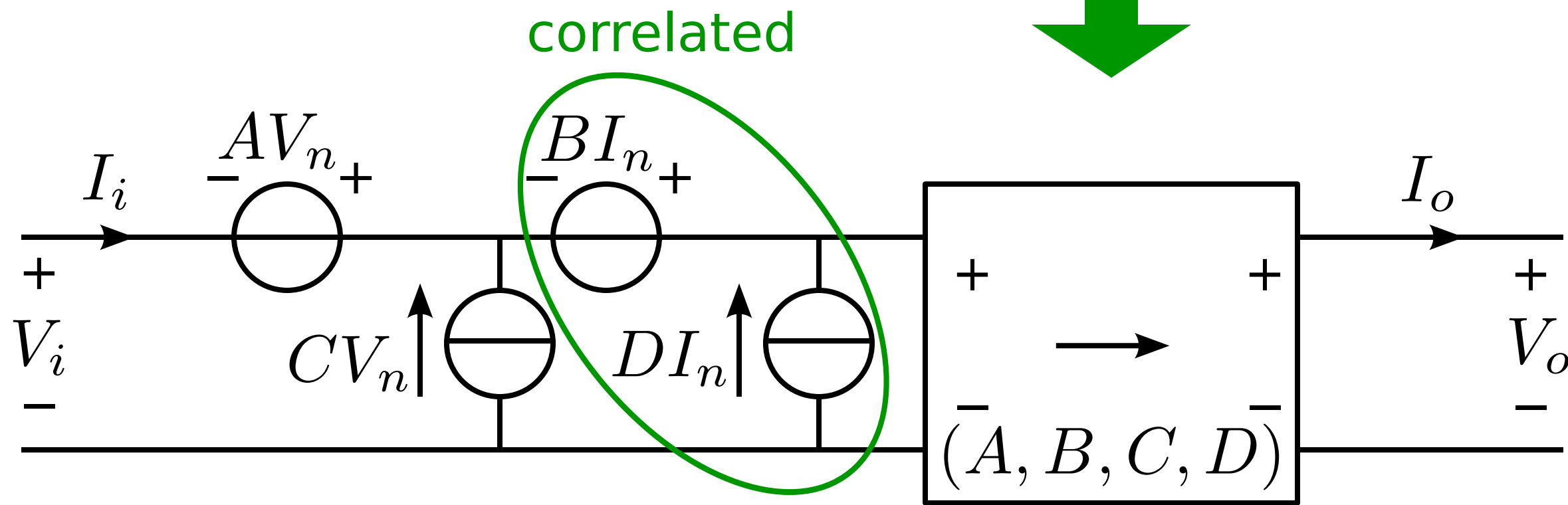
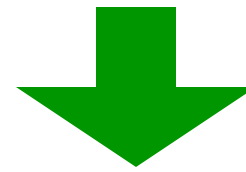
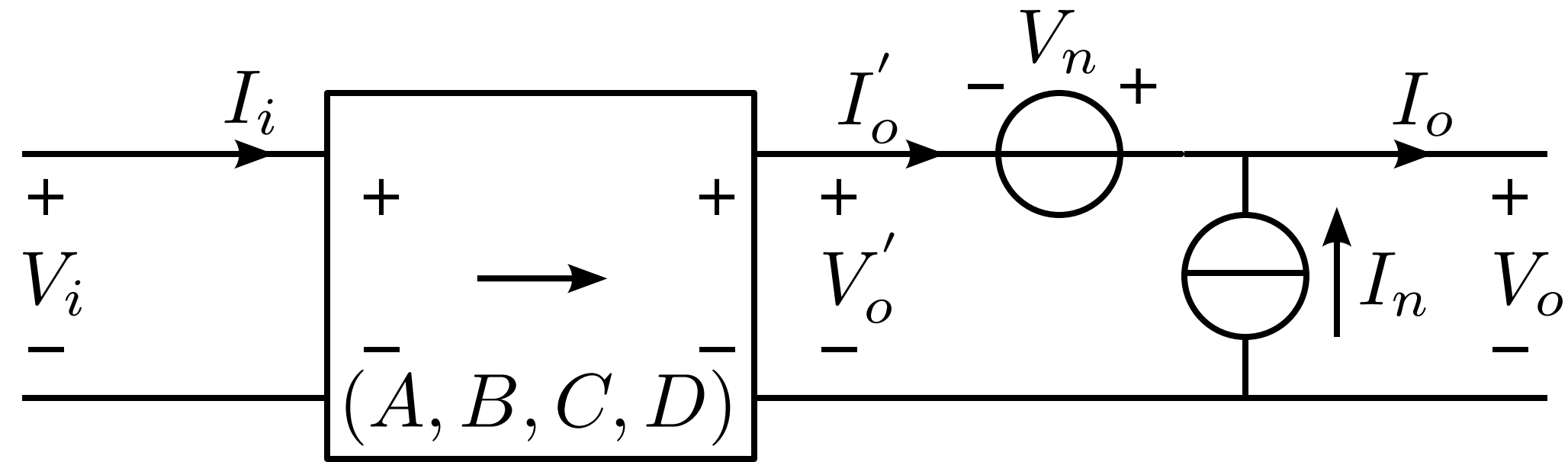
Two-port noise transformations



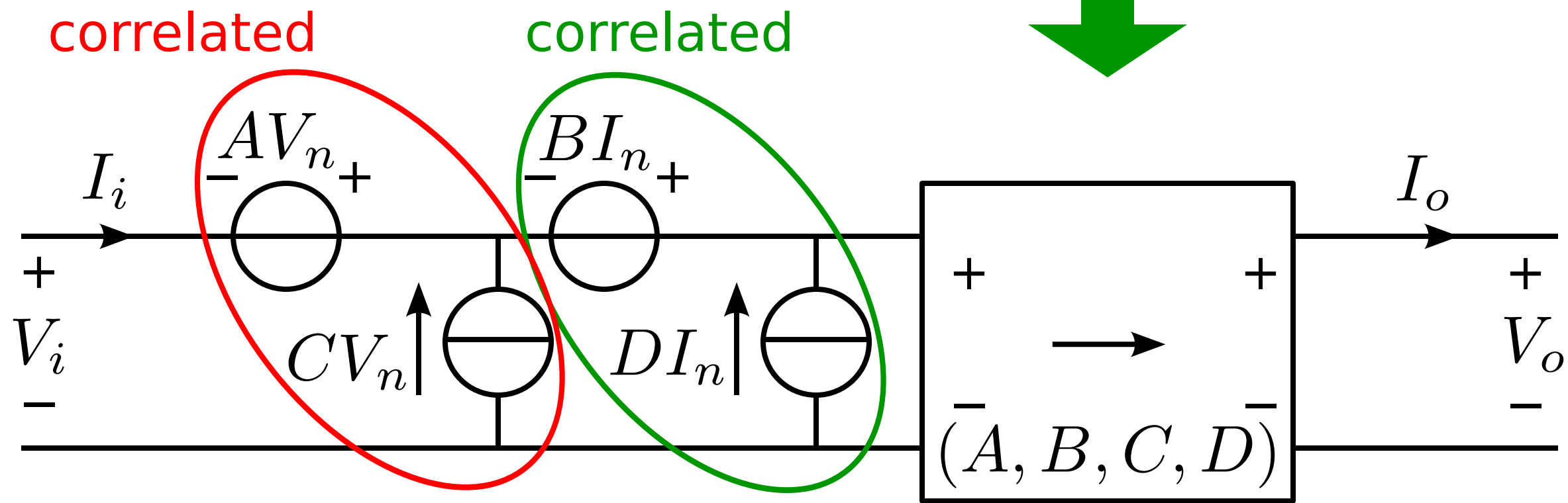
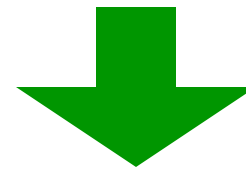
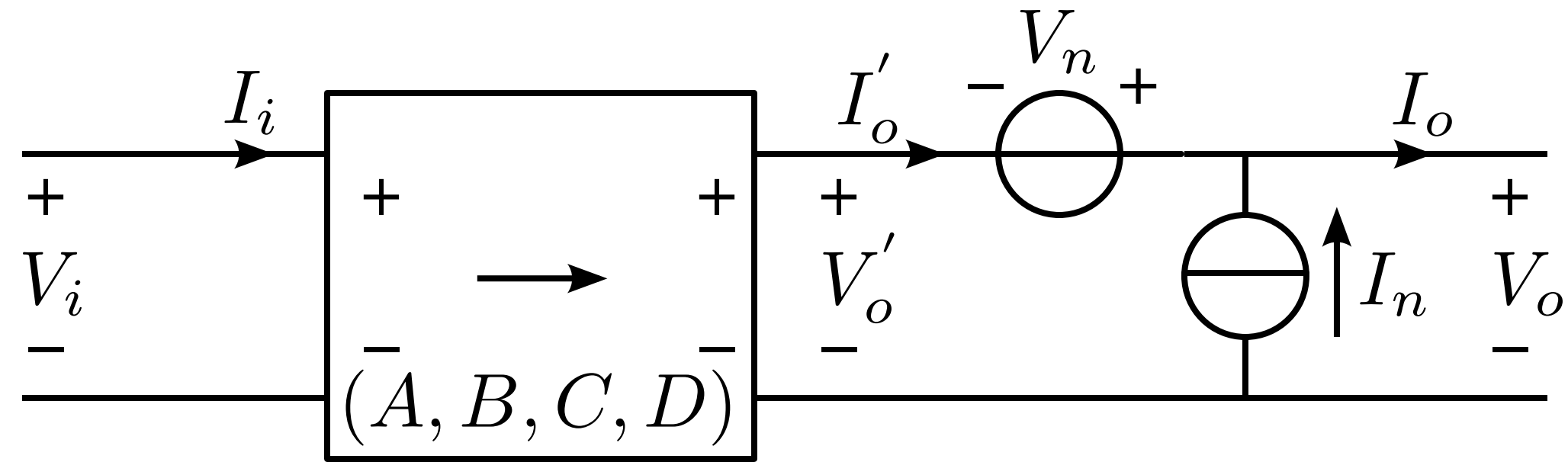
Two-port noise transformations



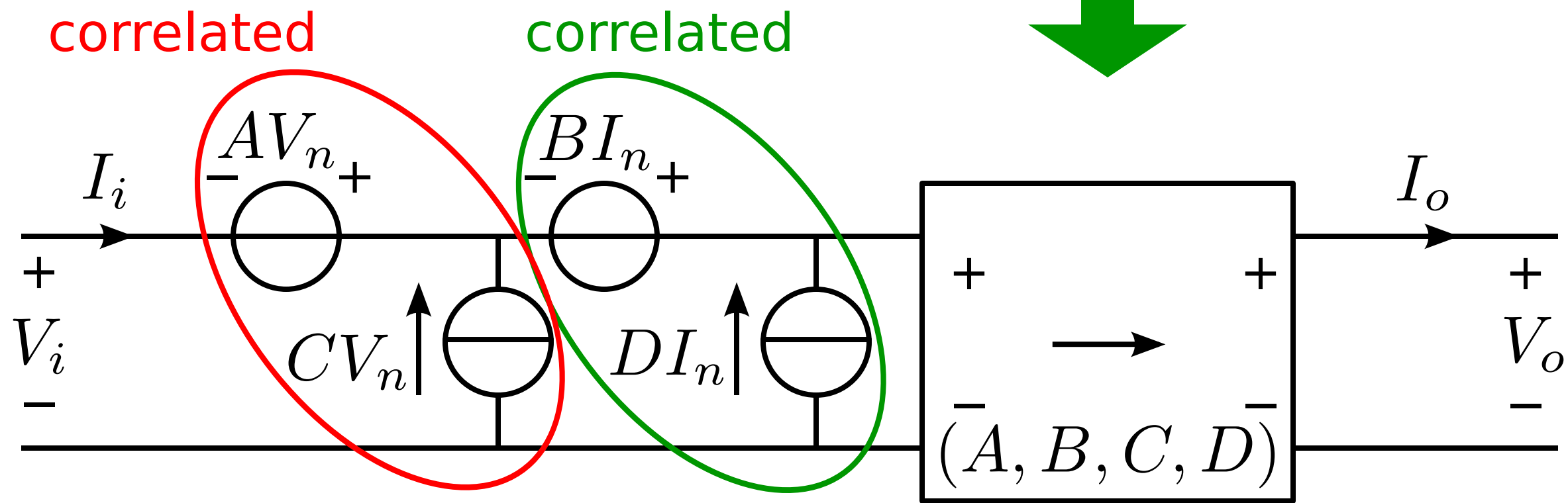
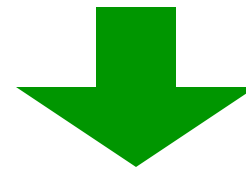
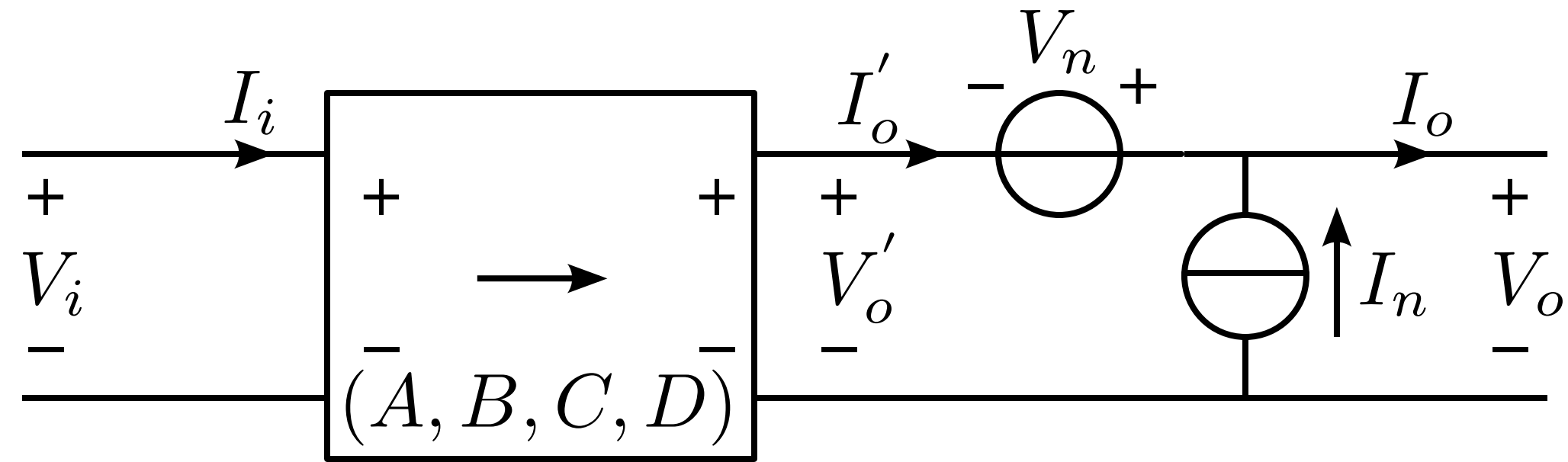
Two-port noise transformations



Two-port noise transformations

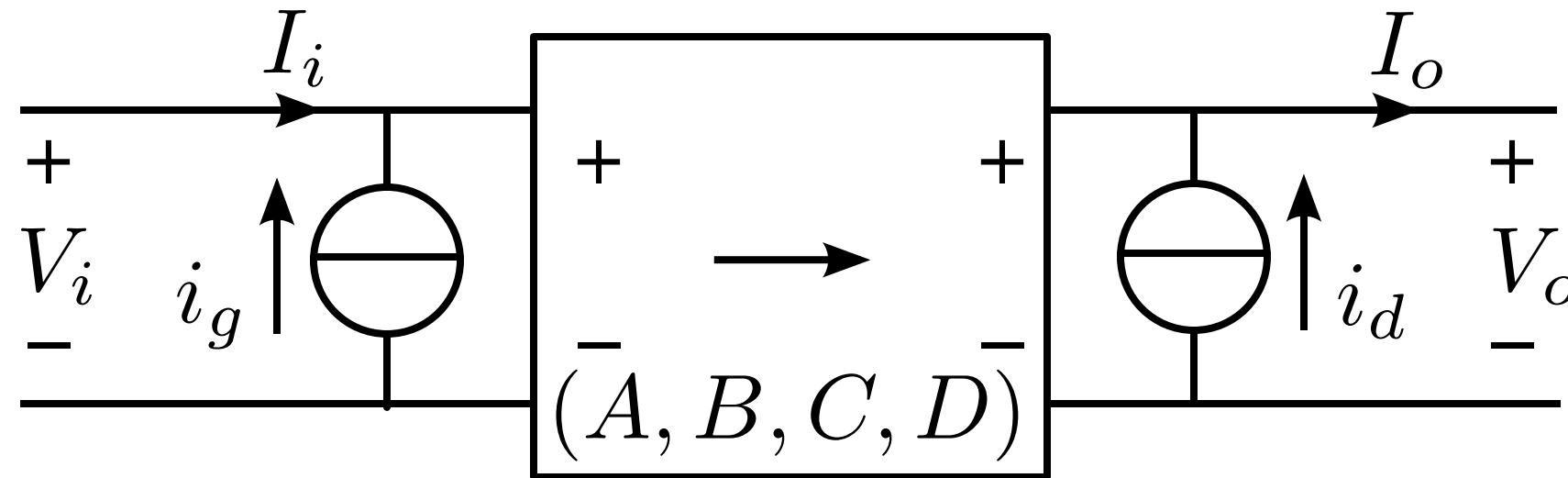


Two-port noise transformations

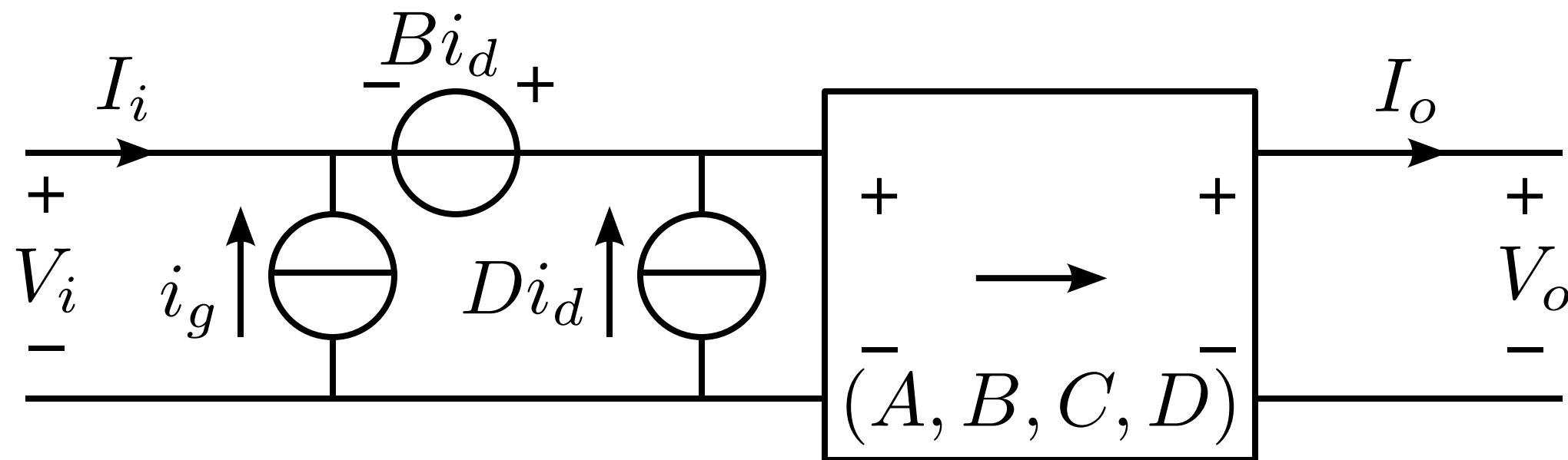
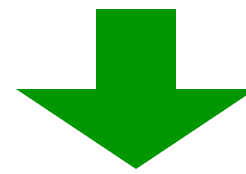
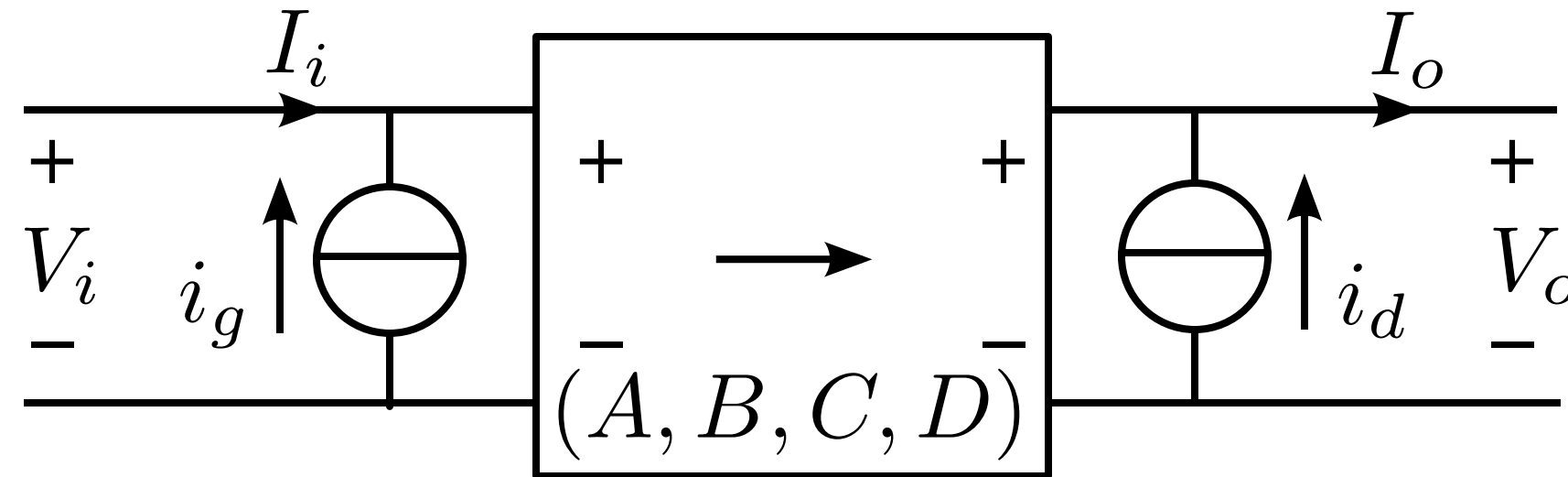


CS stage noise transformations

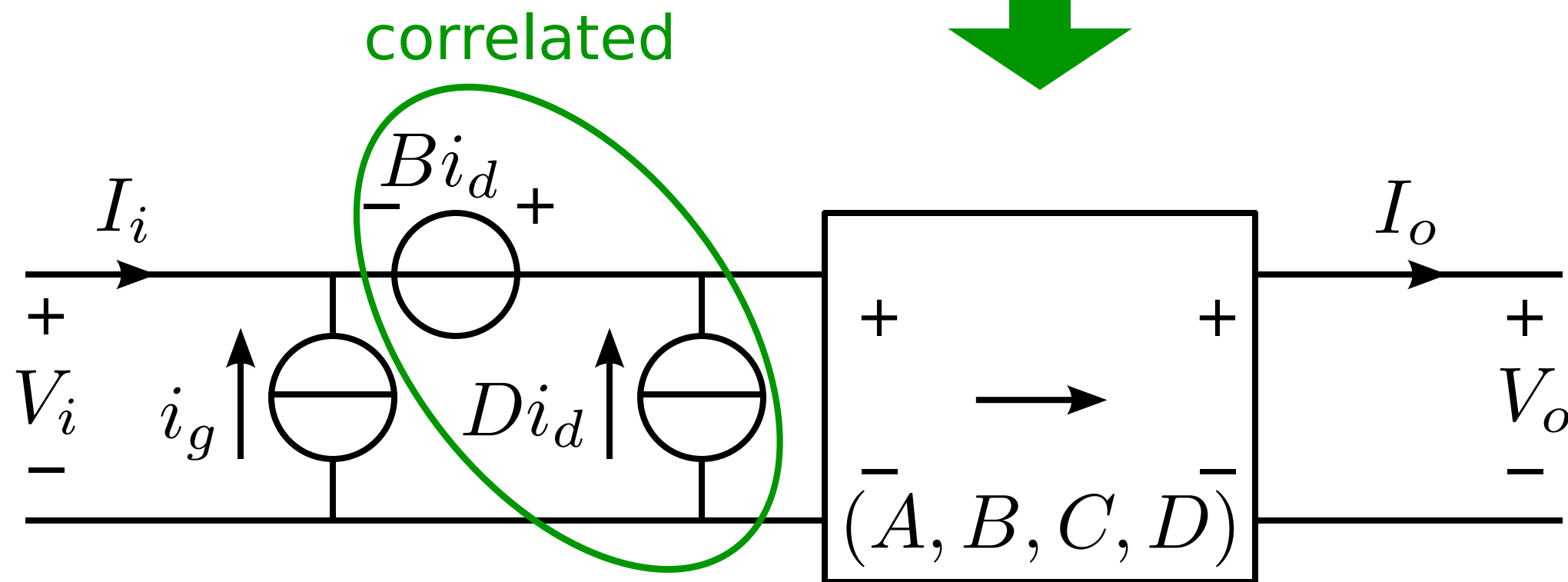
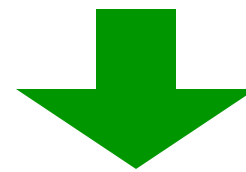
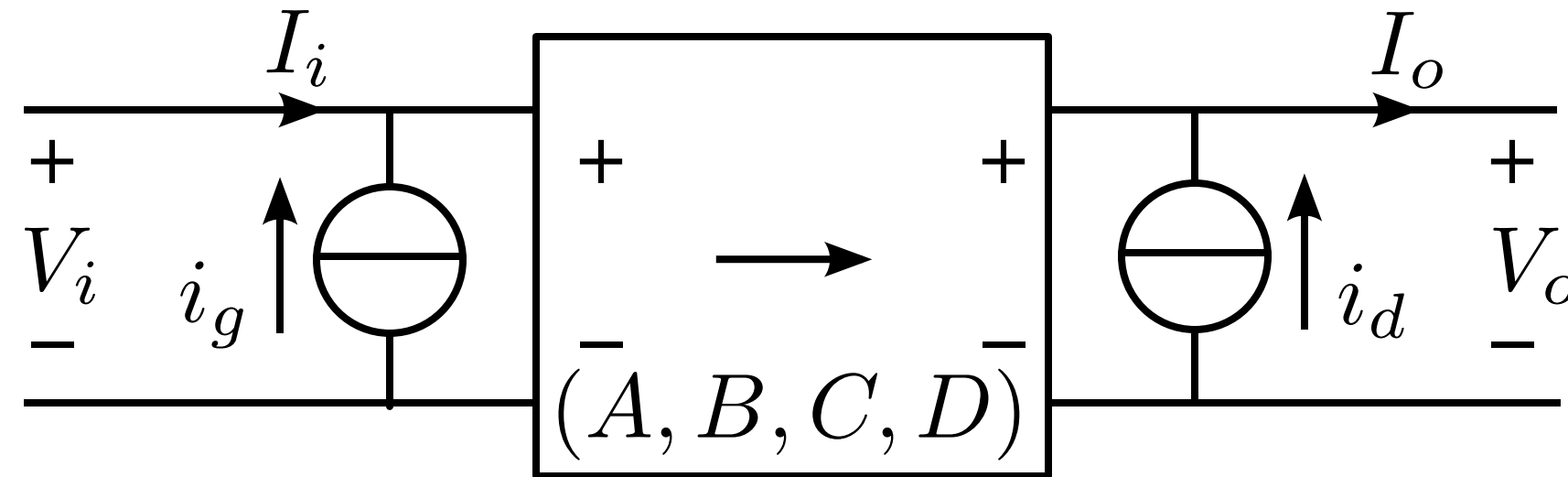
CS stage noise transformations



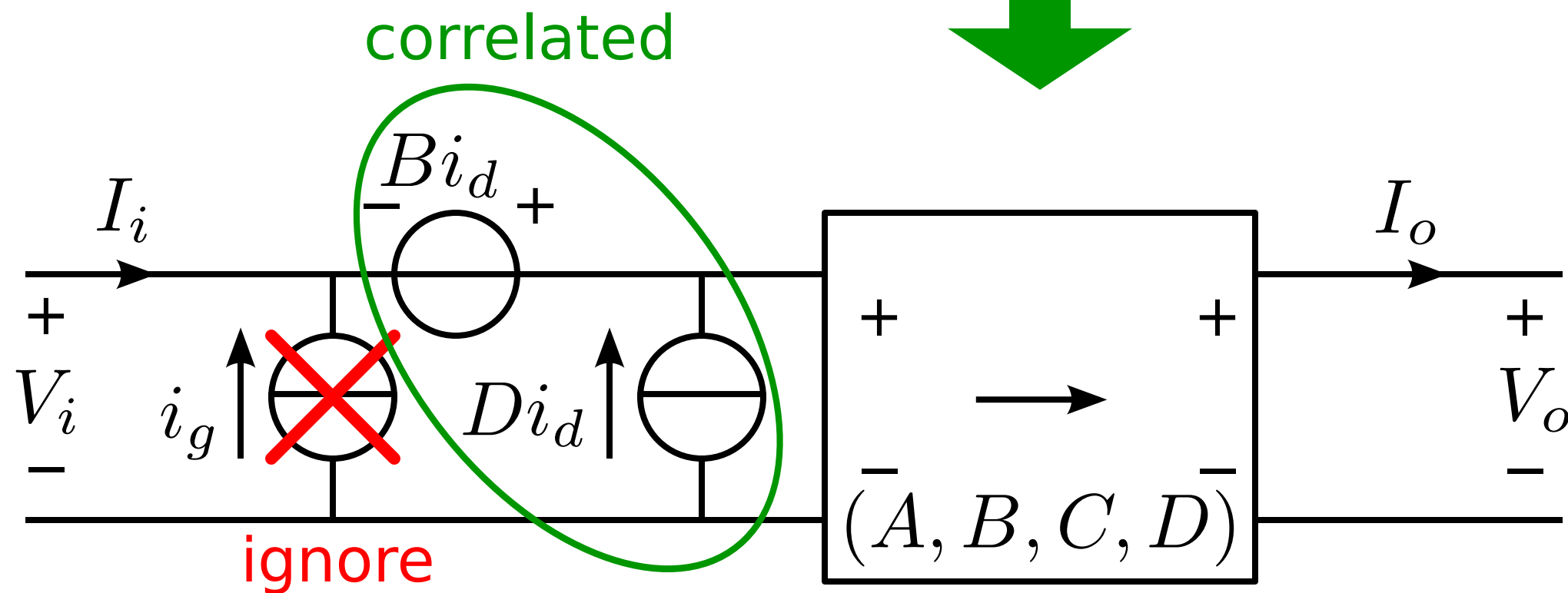
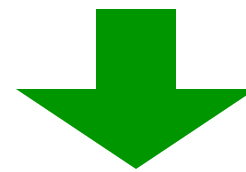
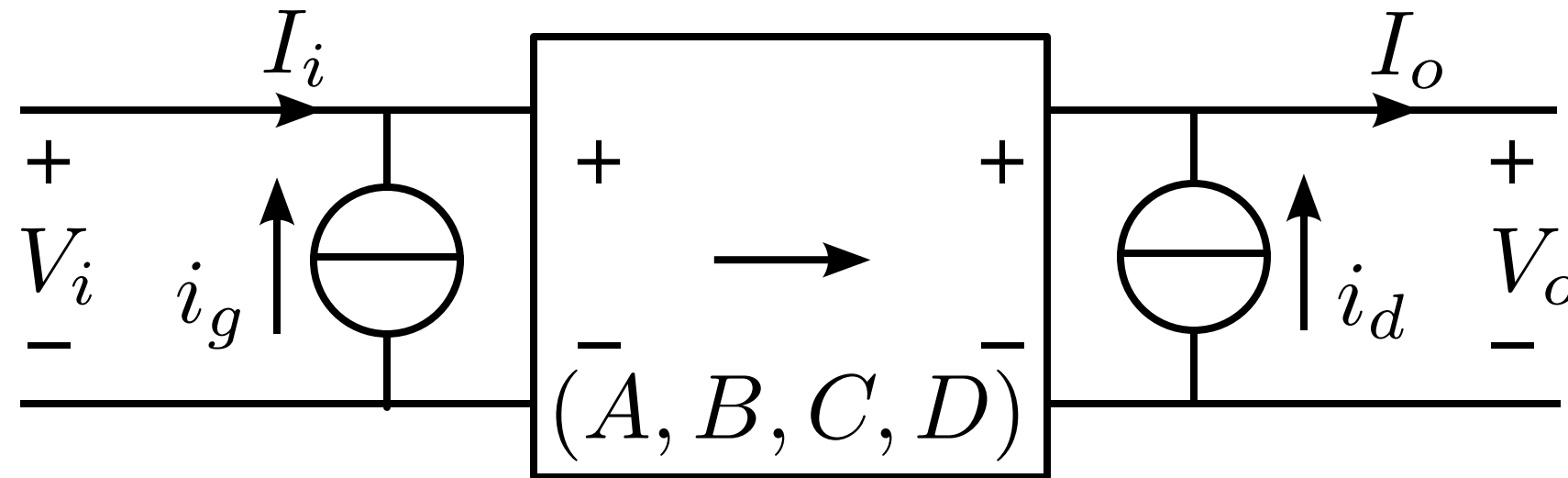
CS stage noise transformations



CS stage noise transformations

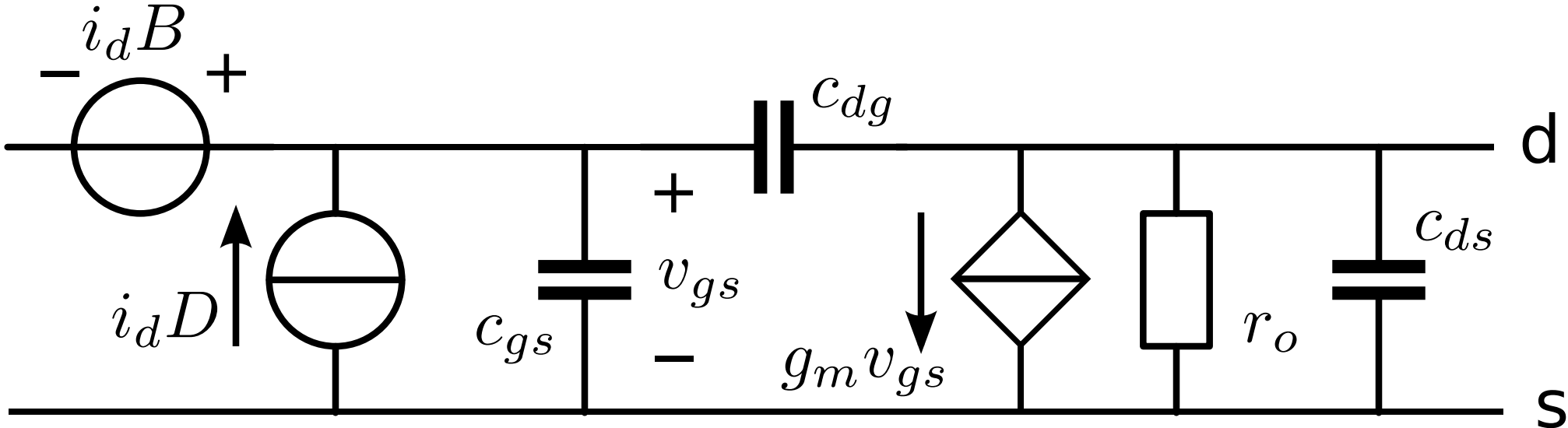


CS stage noise transformations

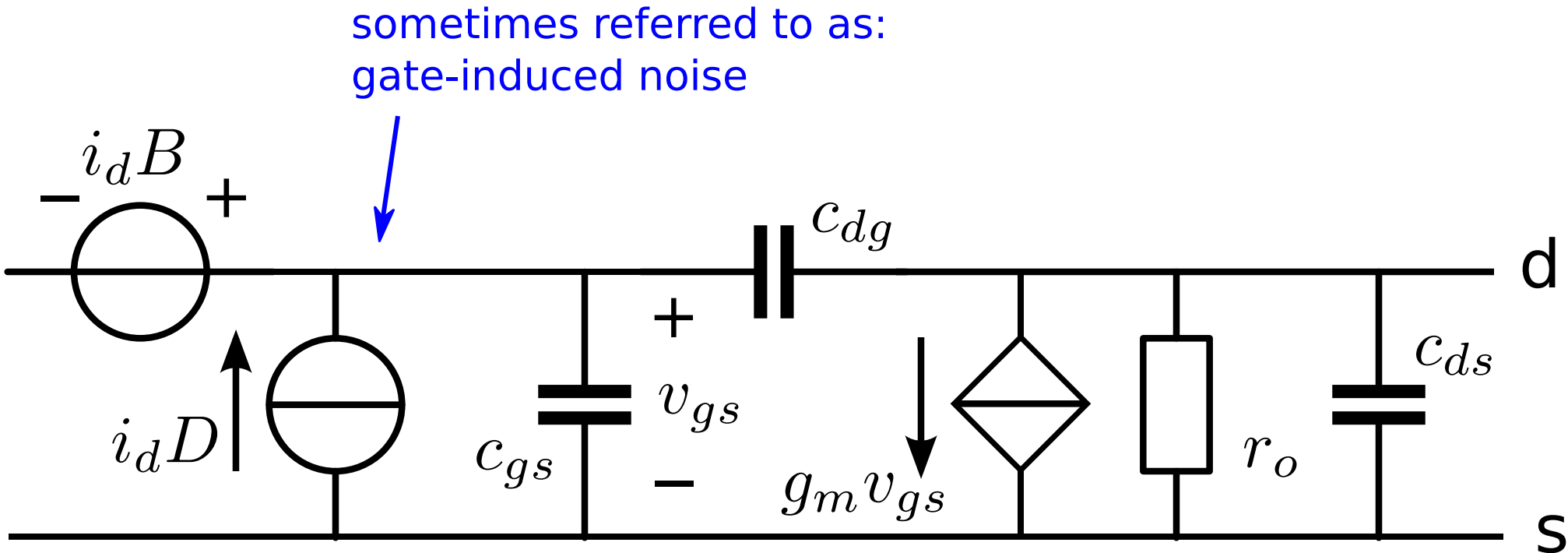


CS stage noise transformed

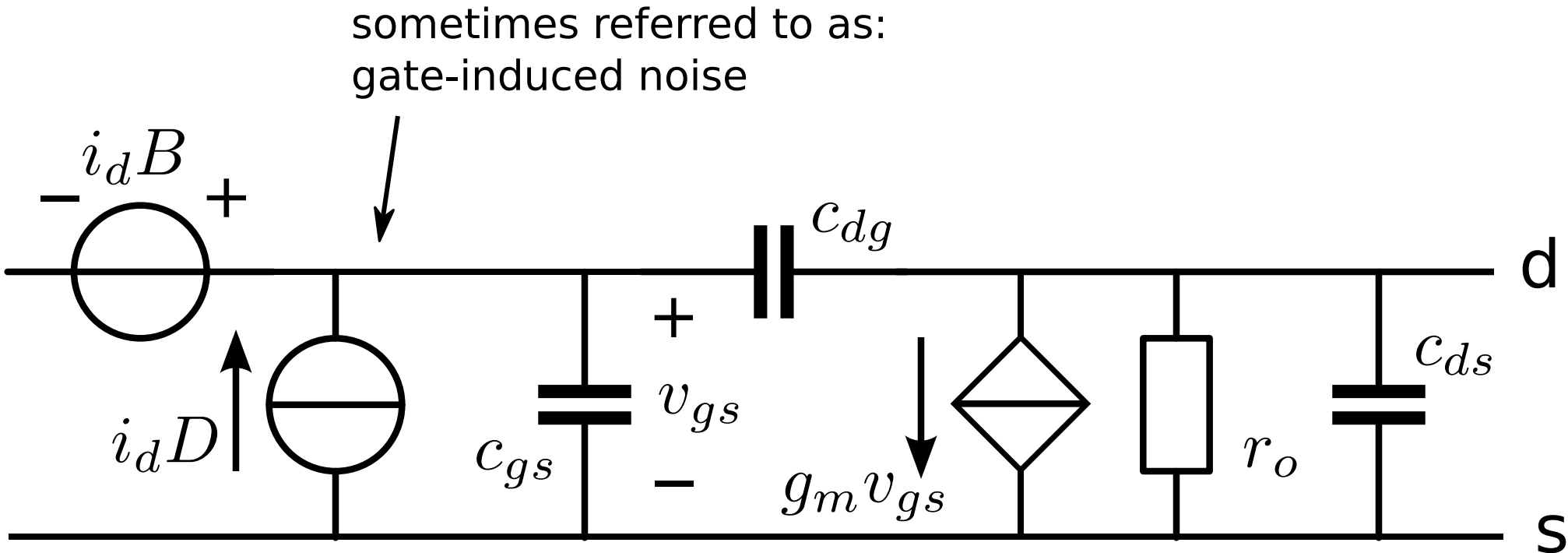
CS stage noise transformed



CS stage noise transformed



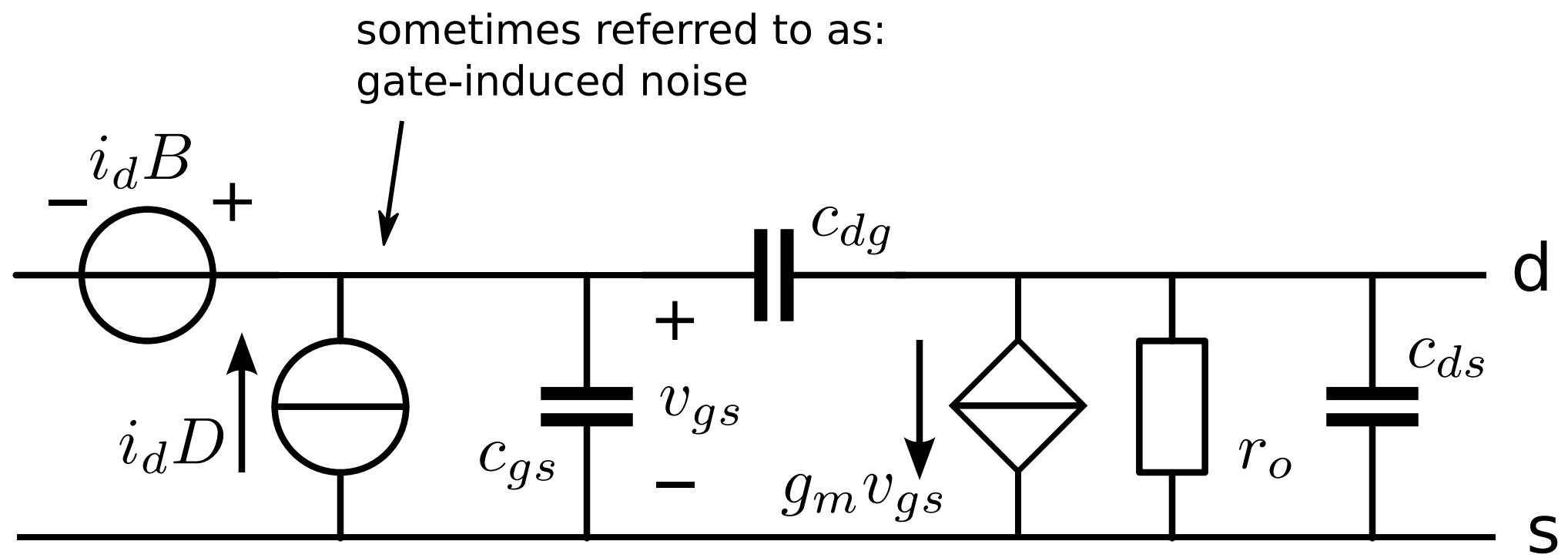
CS stage noise transformed



ignore right half-plane zero

$$z = \frac{g_m}{C_{dg}}$$

CS stage noise transformed



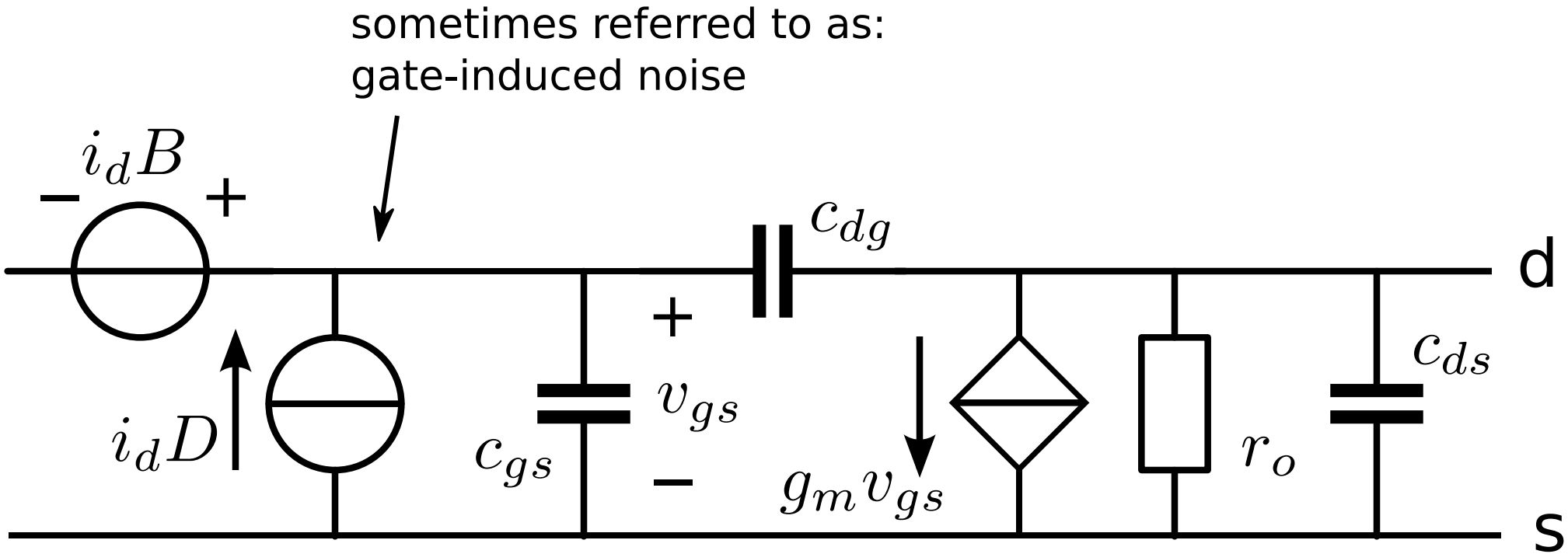
ignore right half-plane zero

$$z = \frac{g_m}{C_{dg}}$$

it's above the cut-off frequency

$$\omega_T = \frac{g_m}{C_{gs}}$$

CS stage noise transformed



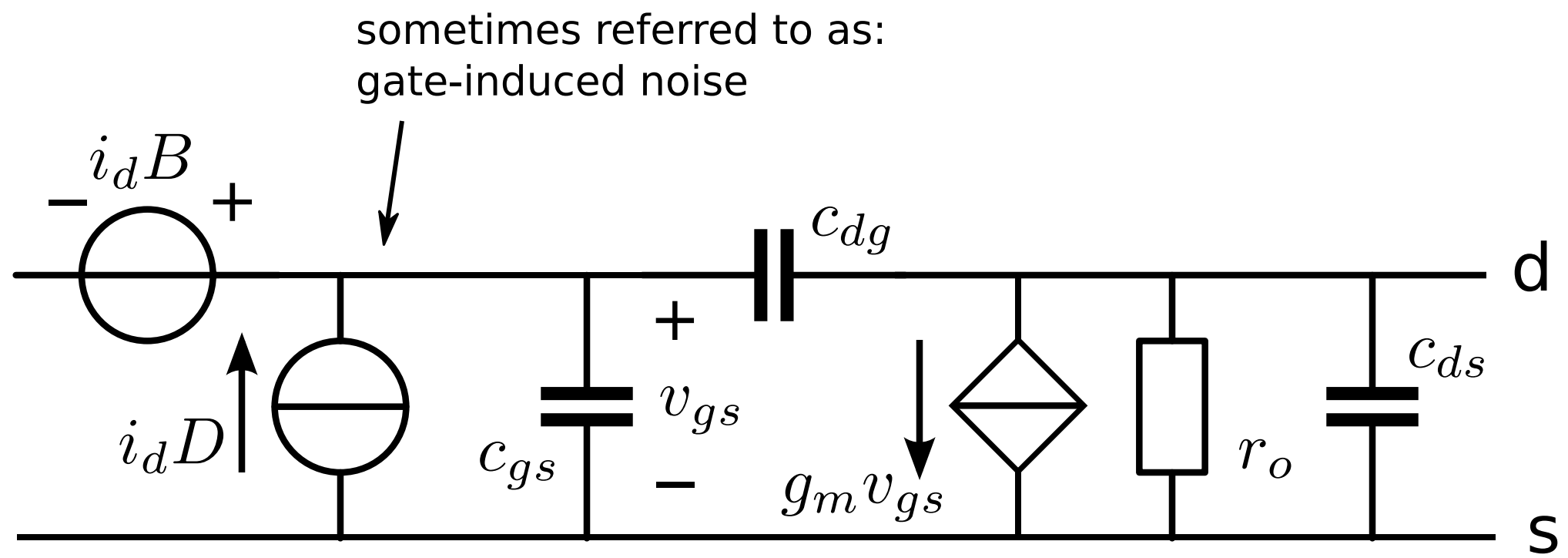
ignore right half-plane zero

$$z = \frac{g_m}{C_{dg}}$$

it's above the cut-off frequency

$$\omega_T = \frac{g_m}{C_{gs}} \quad C_{dg} \ll C_{gs}$$

CS stage noise transformed



ignore right half-plane zero

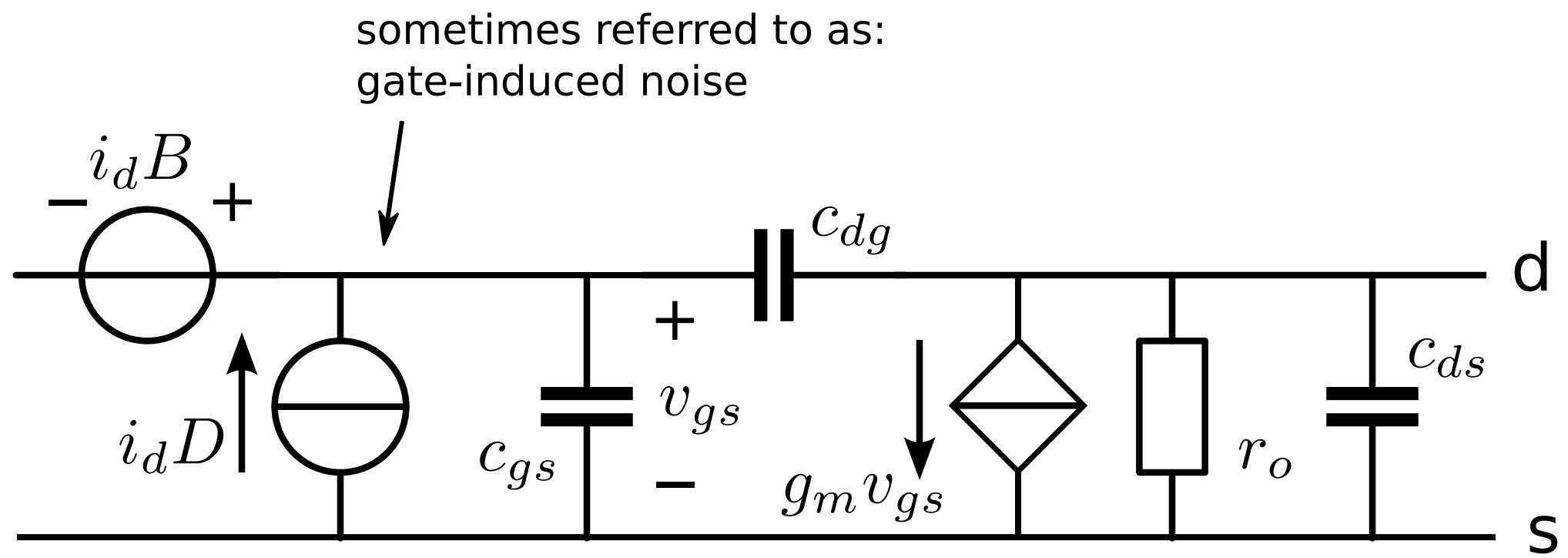
$$z = \frac{g_m}{C_{dg}}$$

it's above the cut-off frequency

$$\omega_T = \frac{g_m}{C_{gs}} \quad C_{dg} \ll C_{gs}$$

$$B = -\frac{1}{g_m}$$

CS stage noise transformed



ignore right half-plane zero

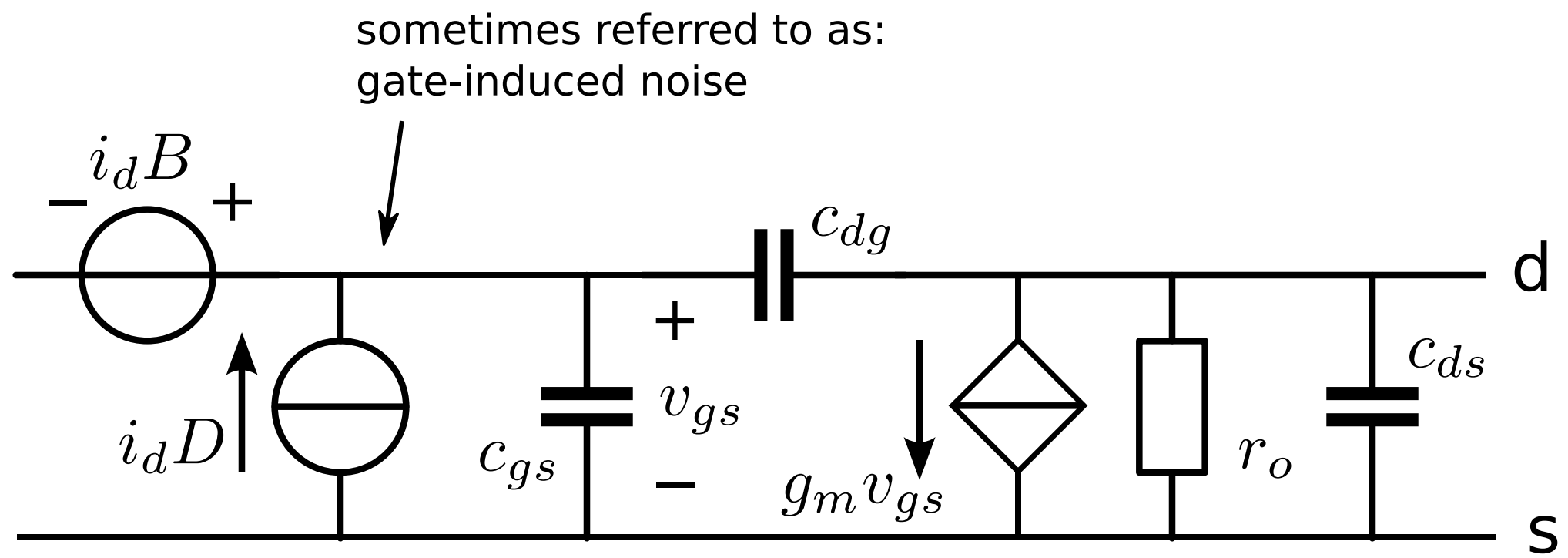
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it's above the cut-off frequency

$$\omega_T = \frac{g_m}{C_{gs}} \quad C_{dg} \ll C_{gs}$$

$$B = -\frac{1}{g_m} \quad D = -\frac{j\omega}{\omega_T}$$

CS stage noise transformed



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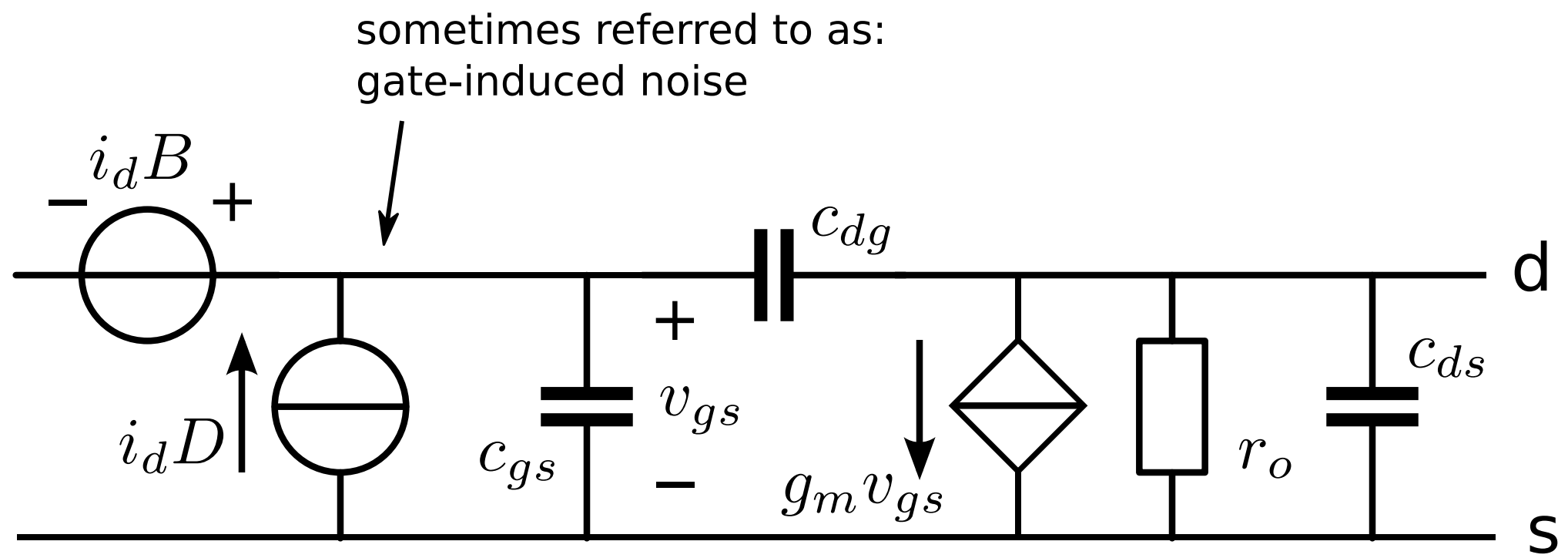
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Two correlated noise sources!

CS stage noise transformed



ignore right half-plane zero

$$z = \frac{g_m}{C_{dg}}$$

it's above the cut-off frequency

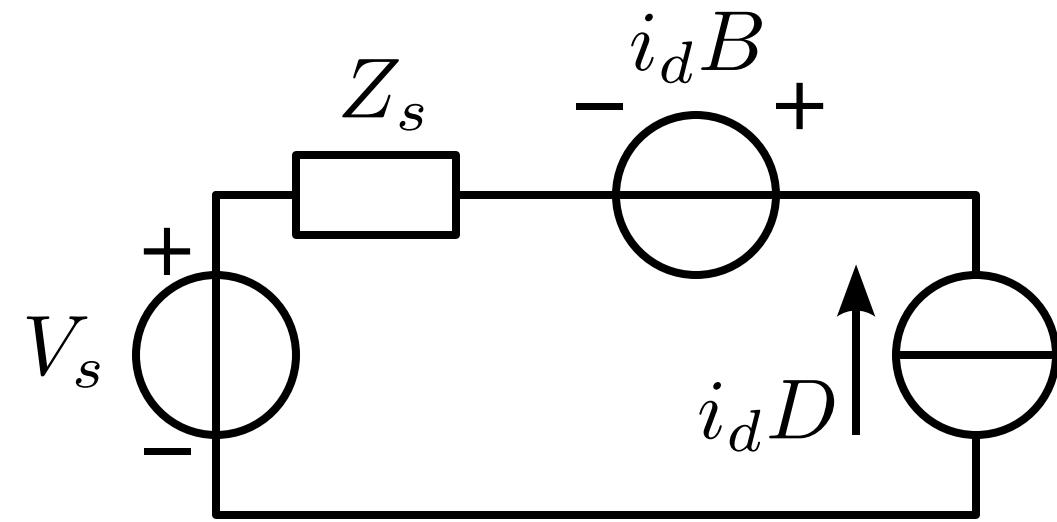
$$\omega_T = \frac{g_m}{C_{gs}} \quad C_{dg} \ll C_{gs}$$

$$B = -\frac{1}{g_m} \quad D = -\frac{j\omega}{\omega_T}$$

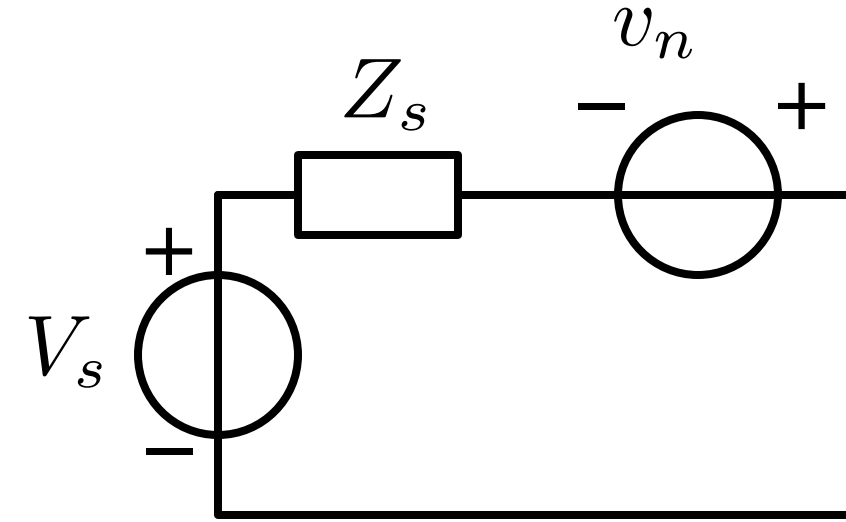
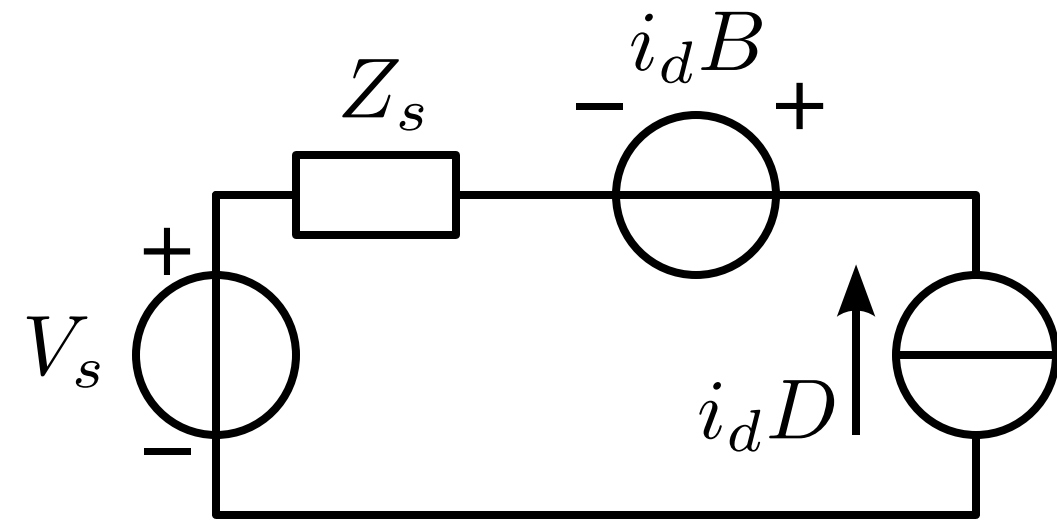
Two correlated noise sources!

CS stage source-referred noise

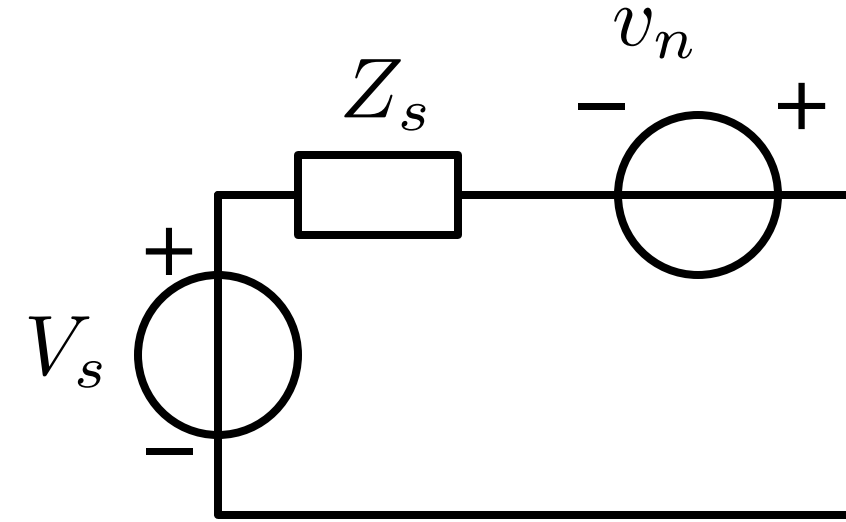
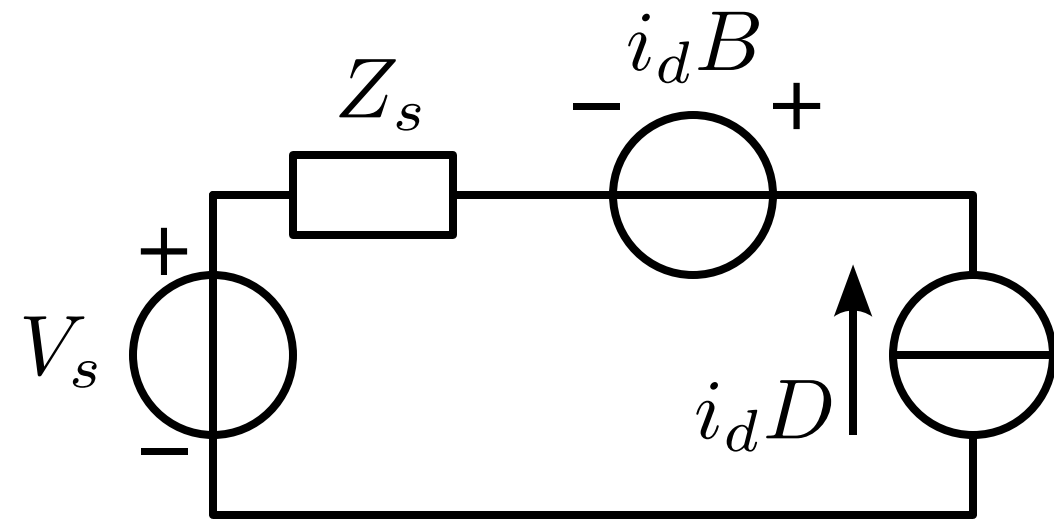
CS stage source-referred noise



CS stage source-referred noise

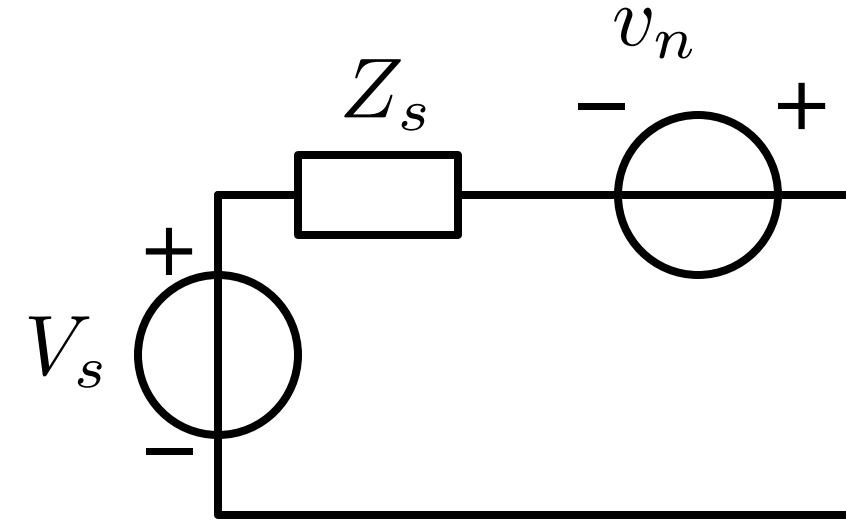
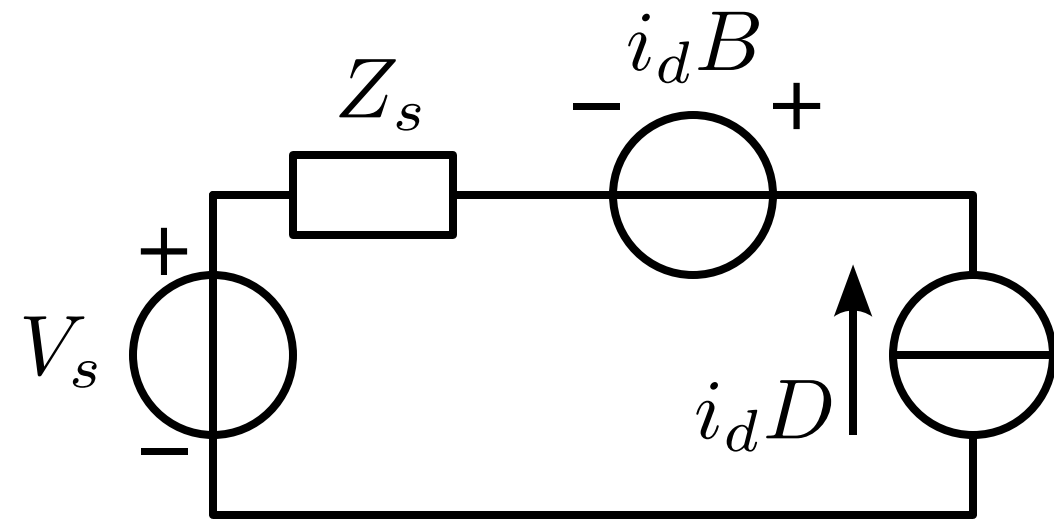


CS stage source-referred noise



v_n : total source-referred noise

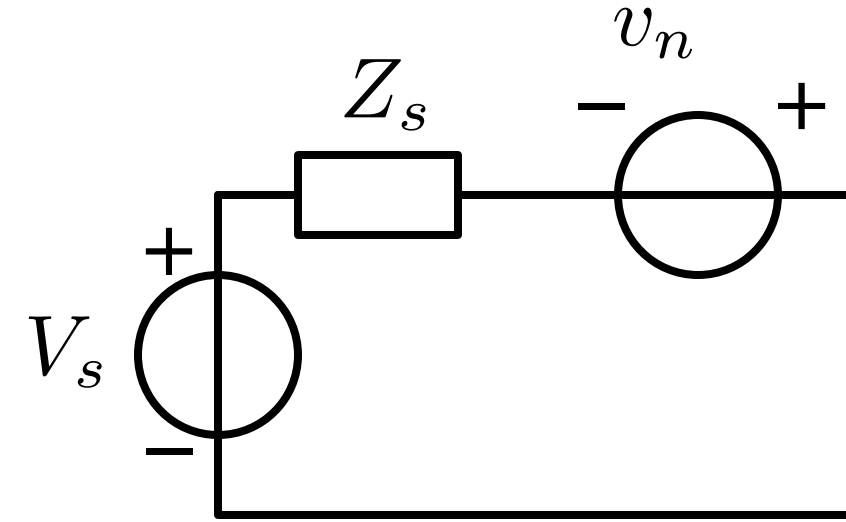
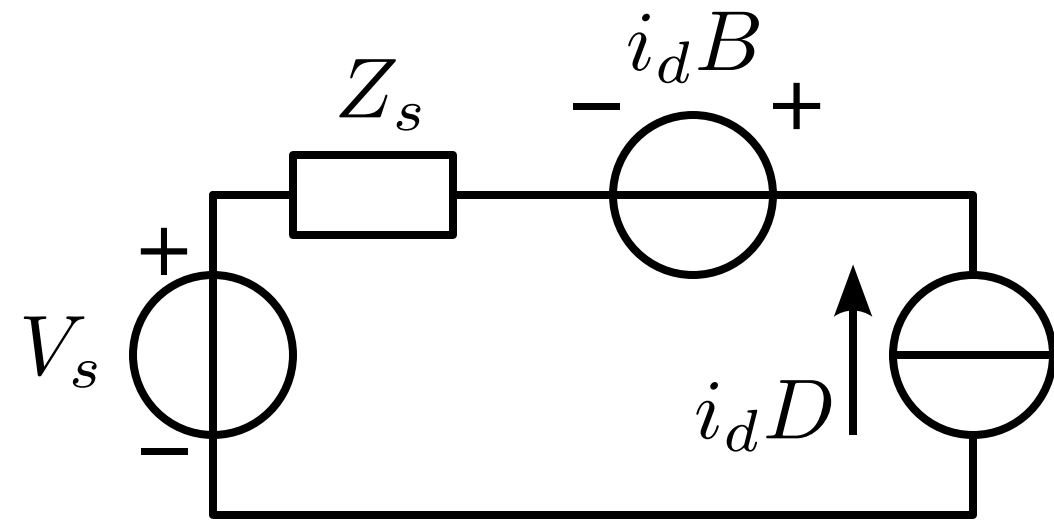
CS stage source-referred noise



v_n : total source-referred noise

$$S_{v_n} = |B + DZ_s|^2 S_{i_d}$$

CS stage source-referred noise

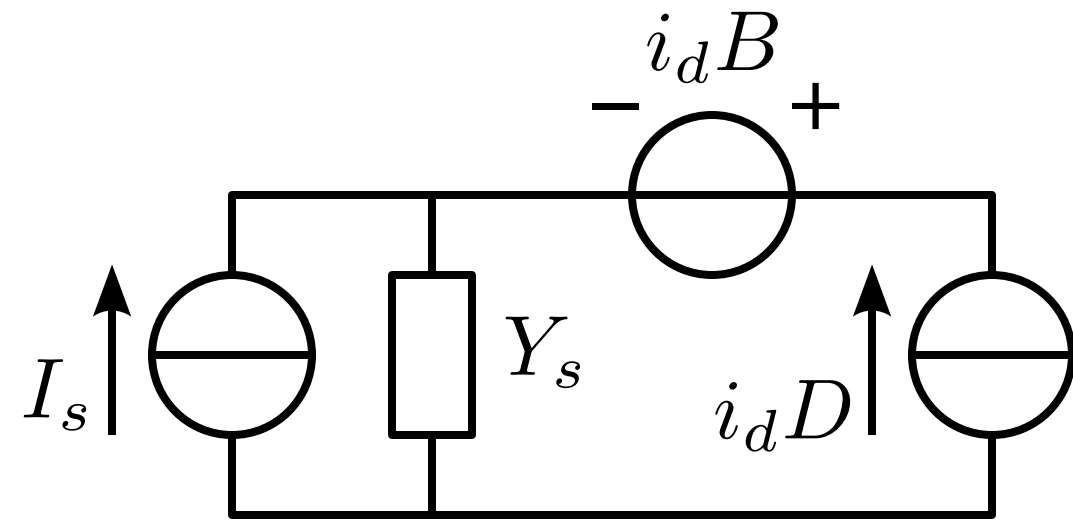


v_n : total source-referred noise

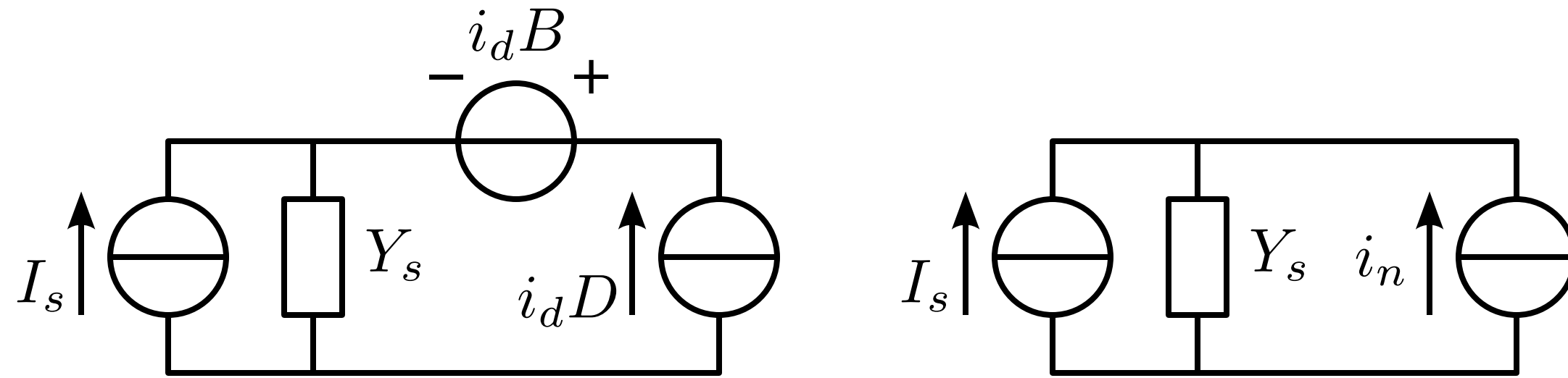
$$S_{v_n} = |B + DZ_s|^2 S_{i_d}$$

CS stage source-referred noise

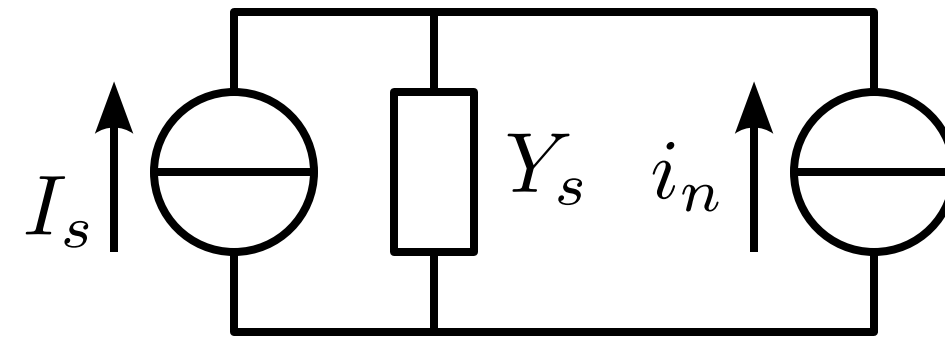
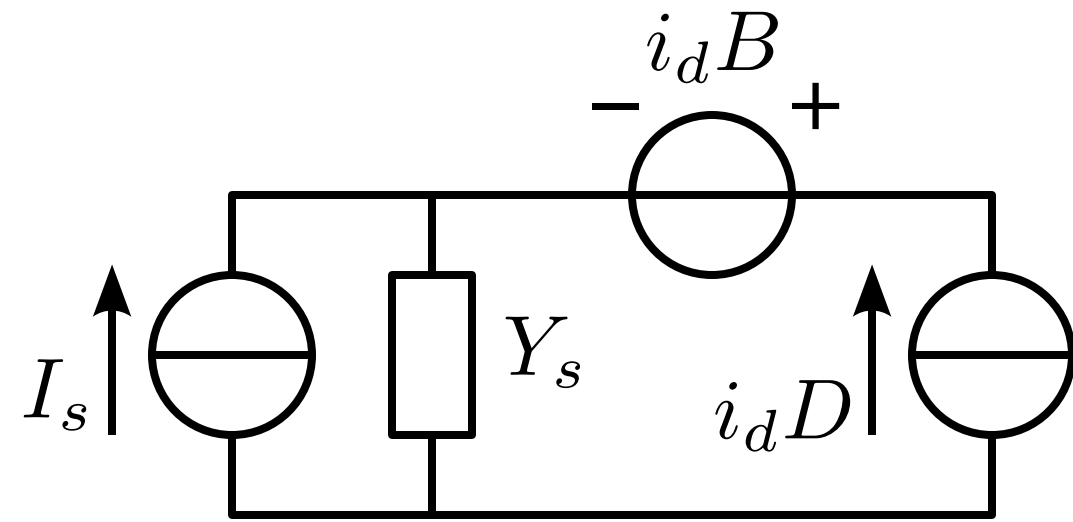
CS stage source-referred noise



CS stage source-referred noise

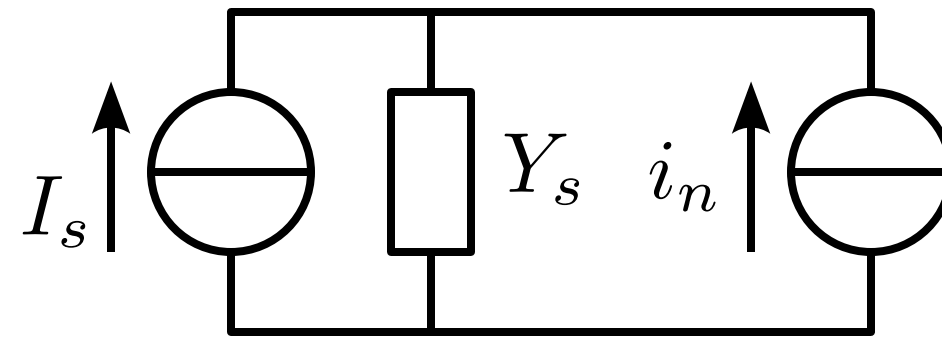
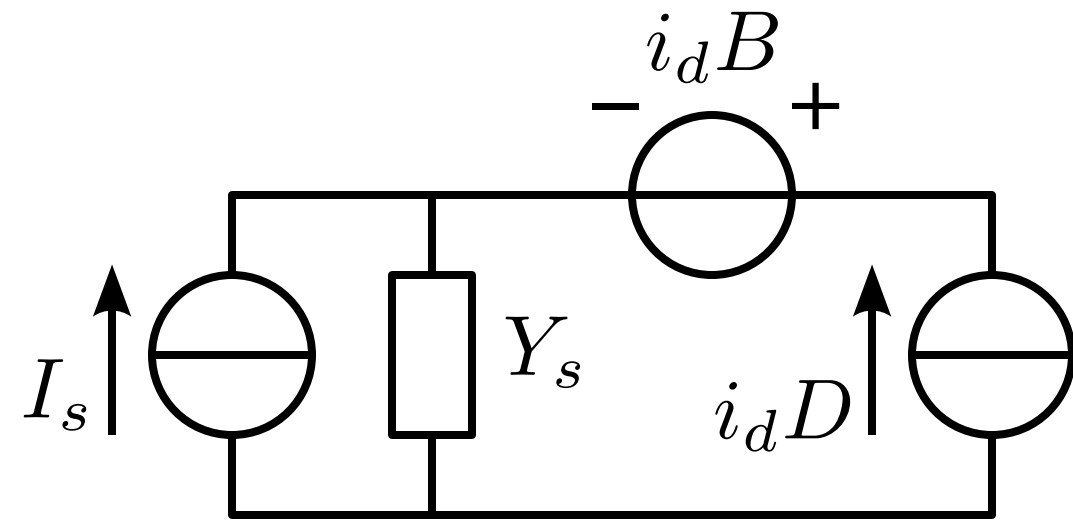


CS stage source-referred noise



i_n : total source-referred noise

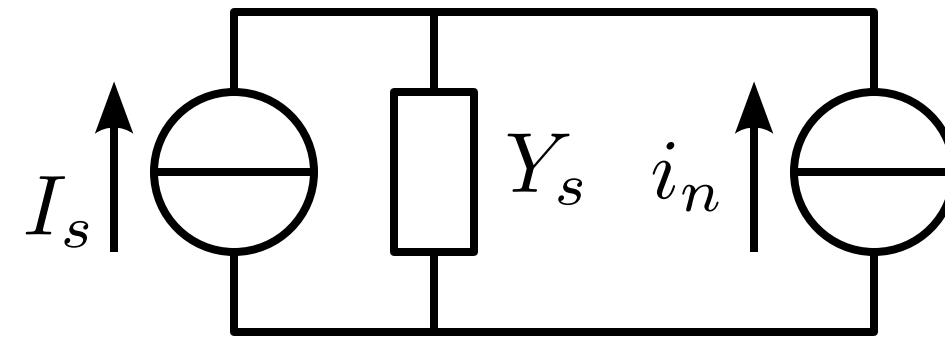
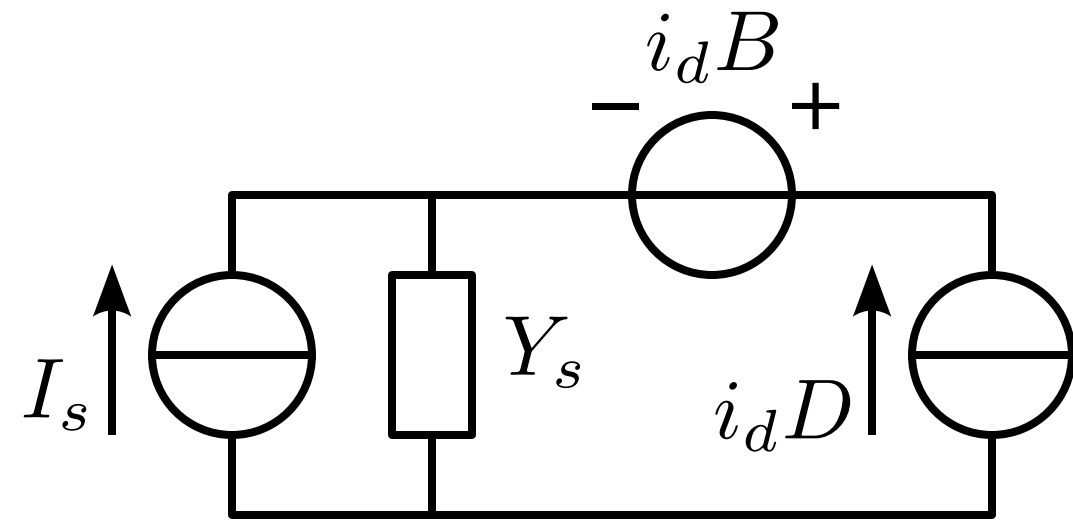
CS stage source-referred noise



i_n : total source-referred noise

$$S_{v_n} = |BY_s + D|^2 S_{i_d}$$

CS stage source-referred noise



i_n : total source-referred noise

$$S_{v_n} = |BY_s + D|^2 S_{id}$$