

# **Structured Electronic Design**

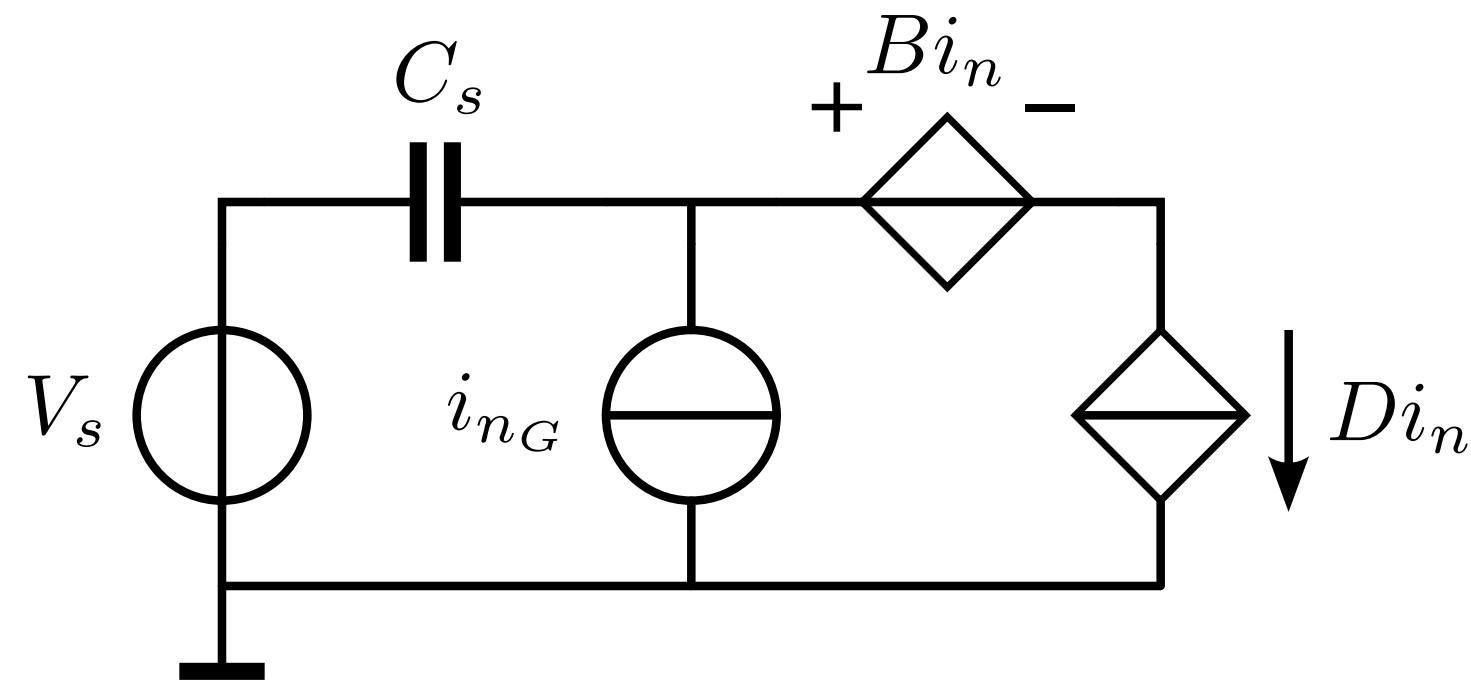
CS stage:

Noise optimization with a capacitive voltage source

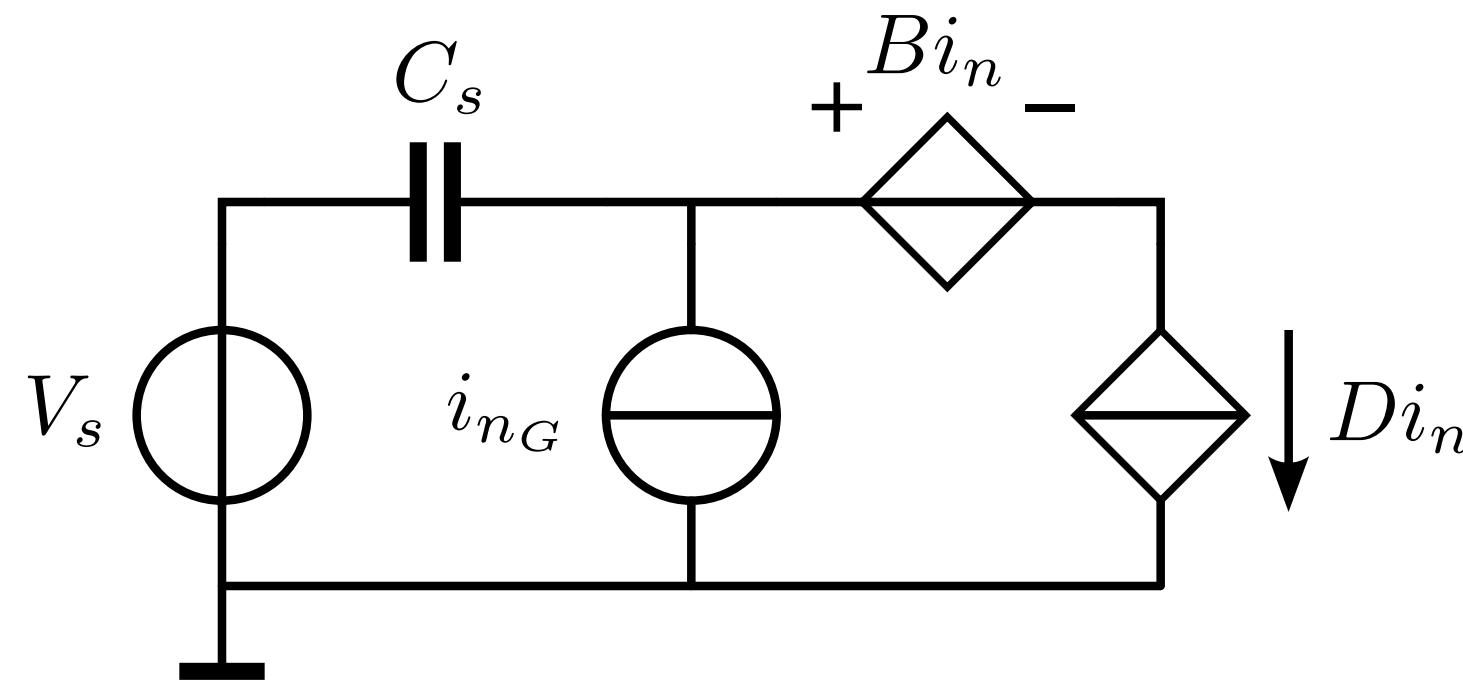
*Anton J.M. Montagne*

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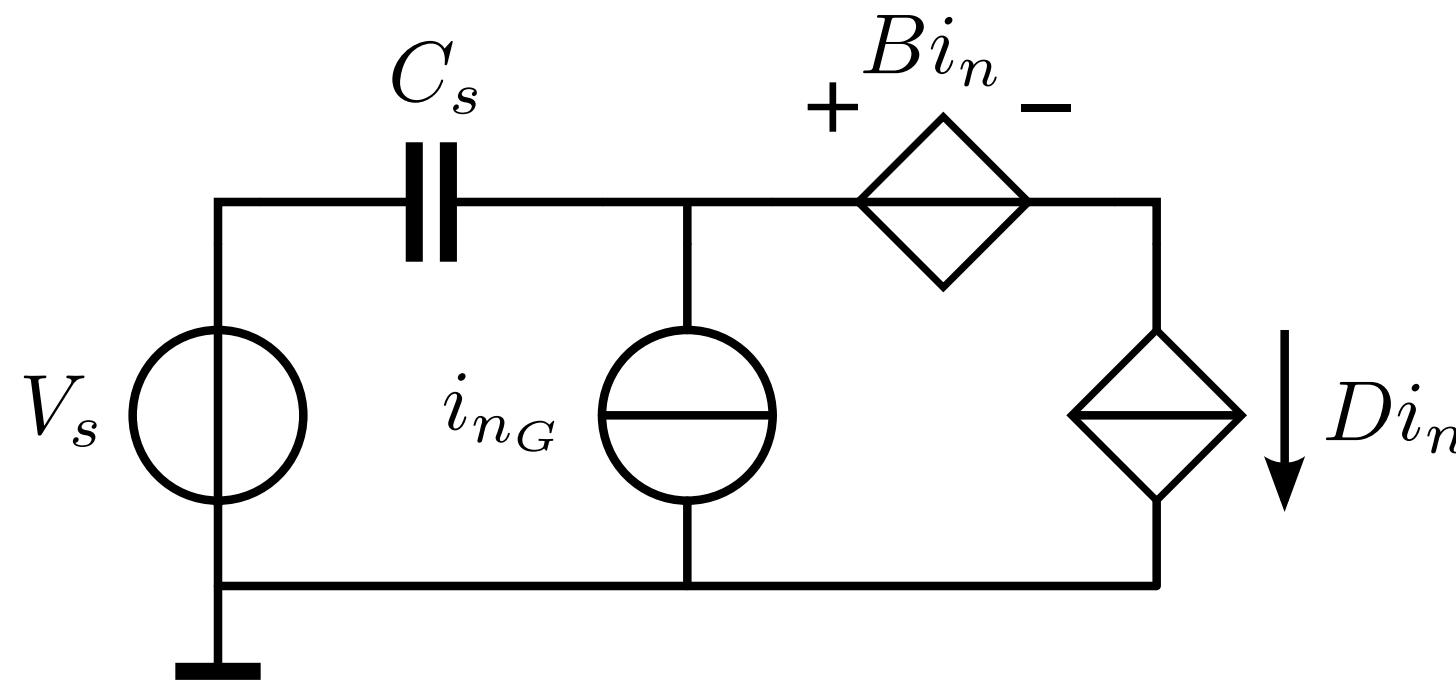
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$$S_{i_{nG}} = 2qI_G$$

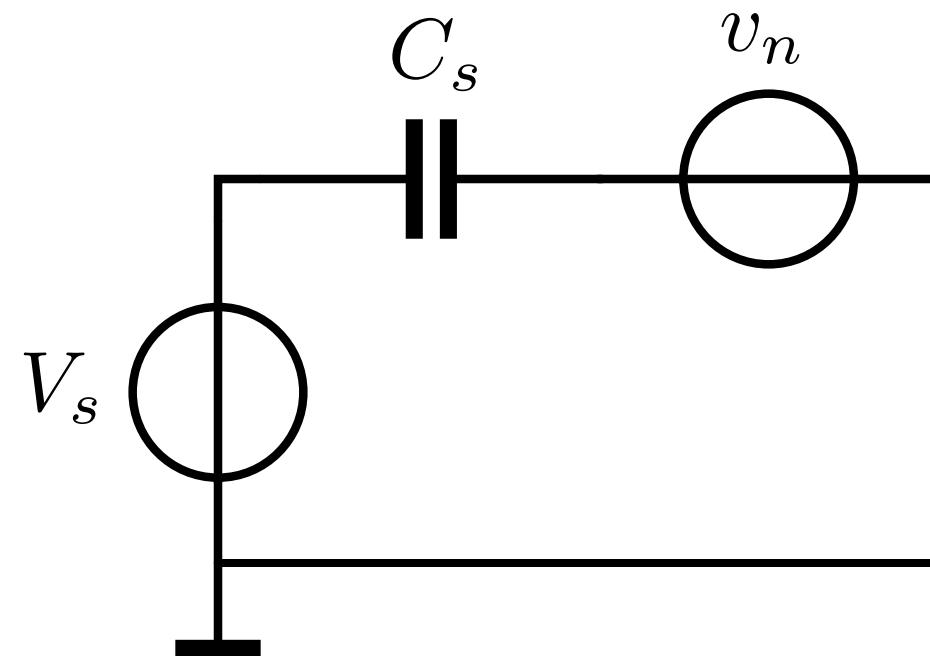
$$B = -\frac{1}{g_m}$$

$$D = -\frac{j2\pi f c_{iss}}{g_m} = -\frac{jf}{f_T}$$

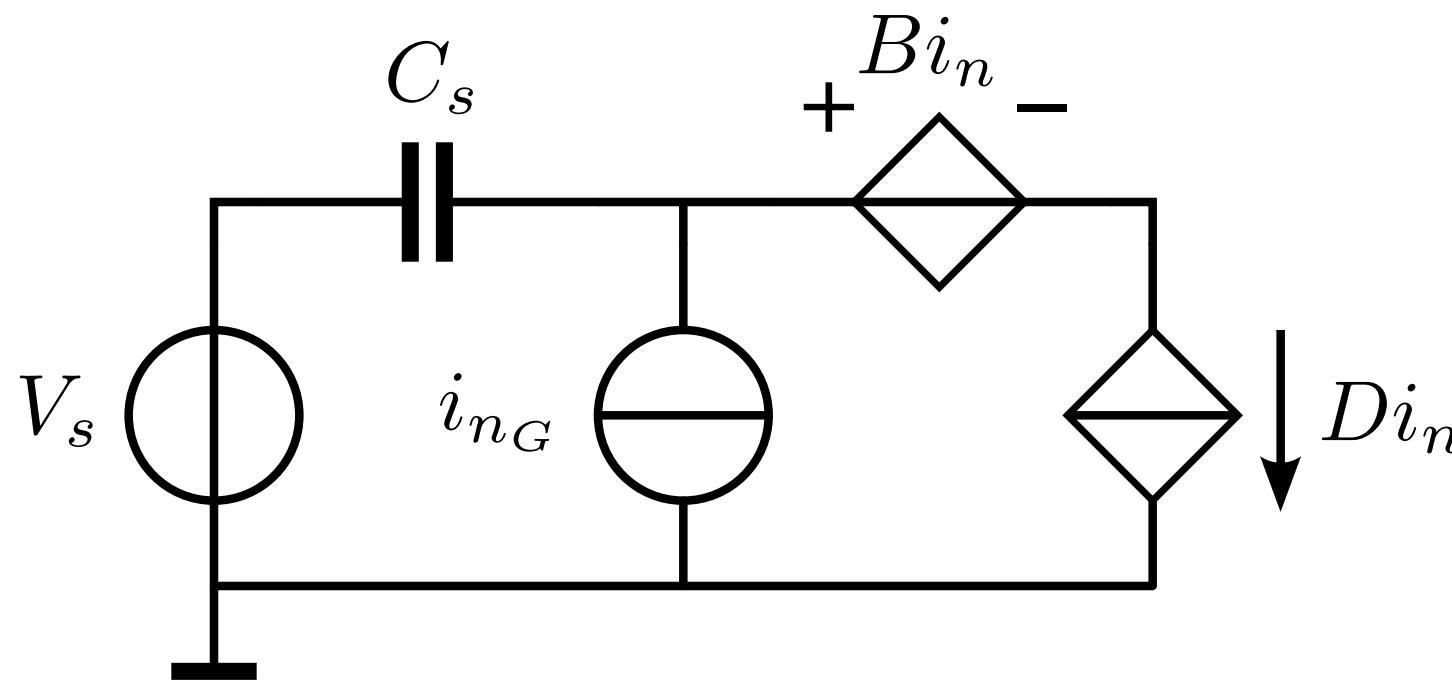
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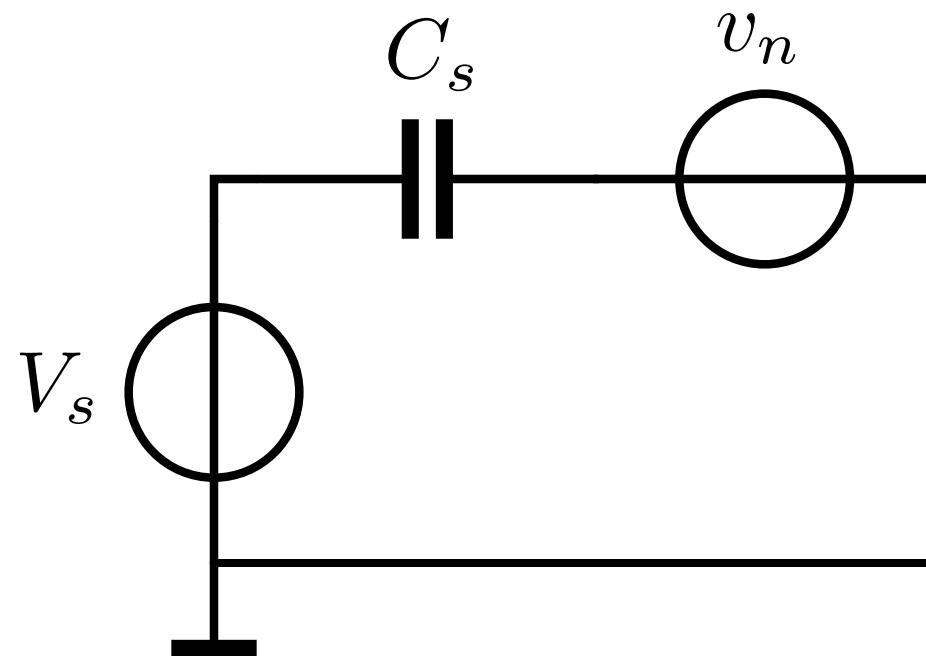
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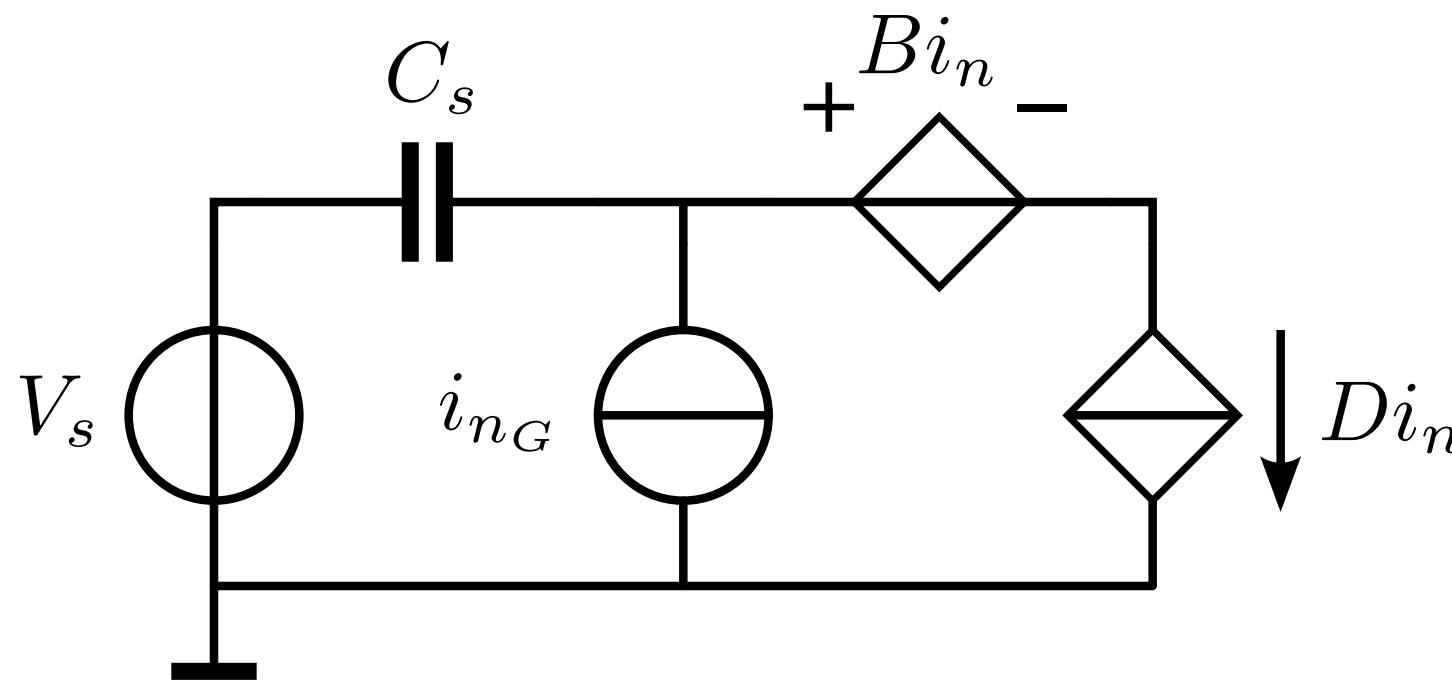


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Case 1: ignore 1/f noise, ignore  $I_G$

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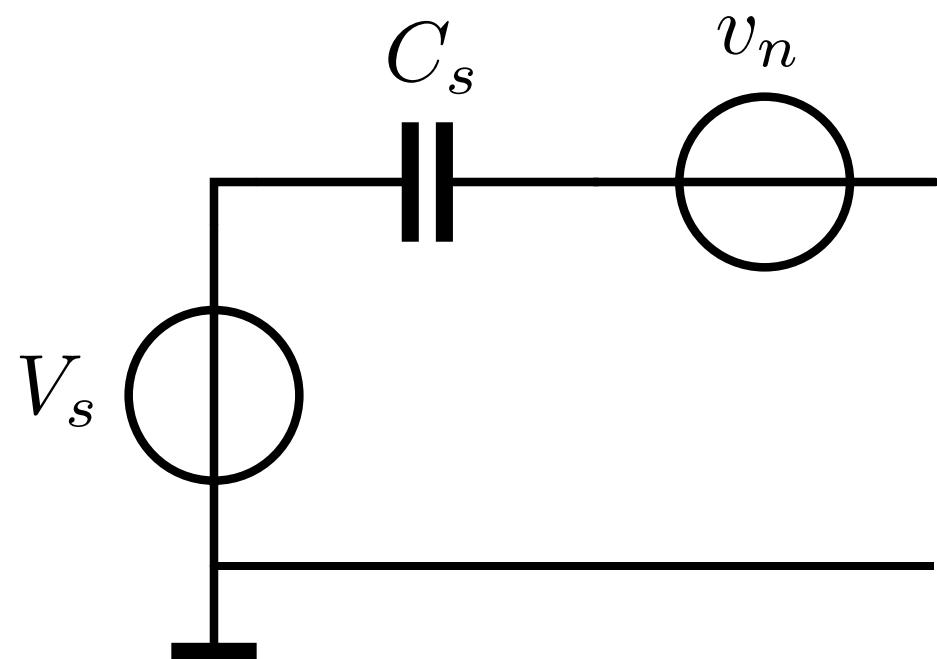


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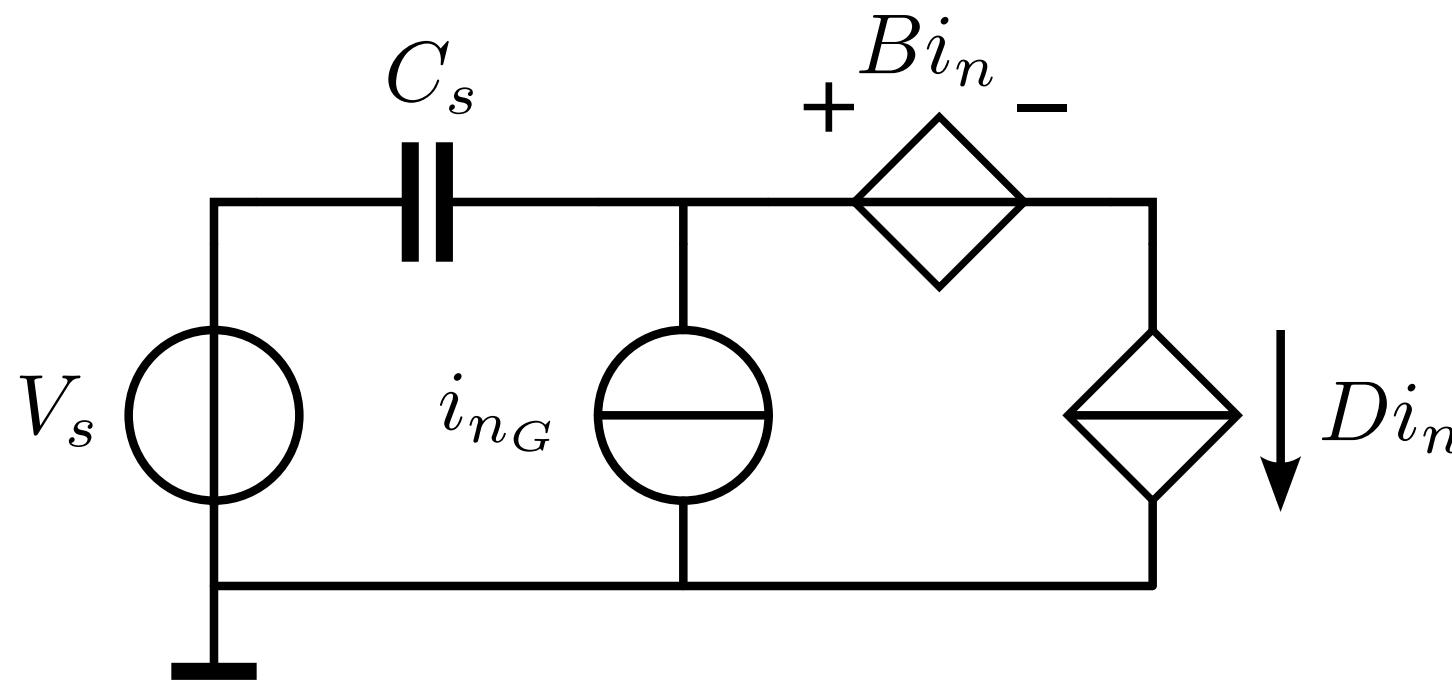
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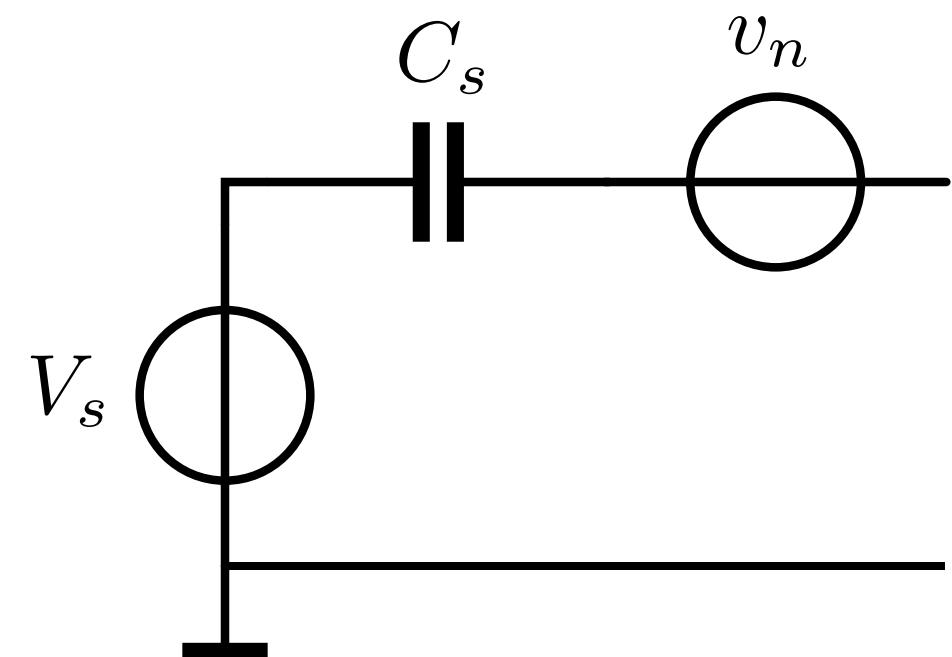
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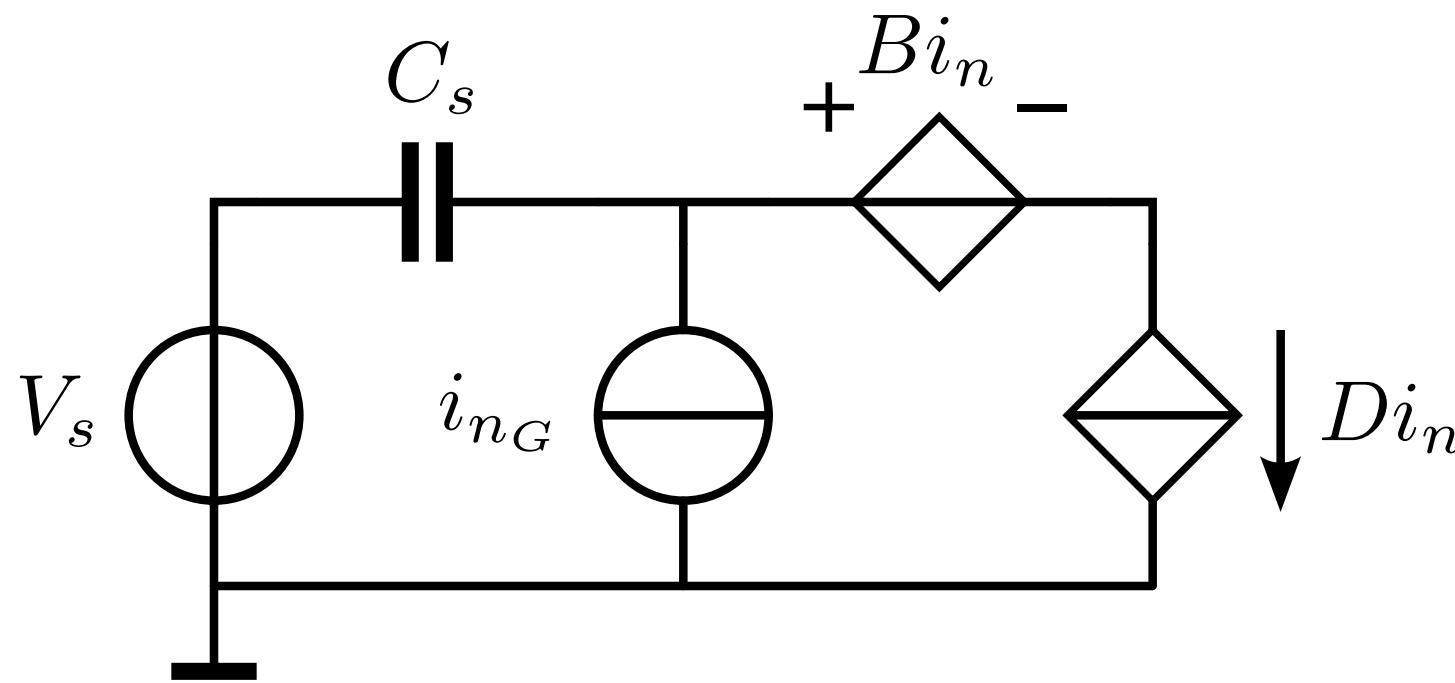
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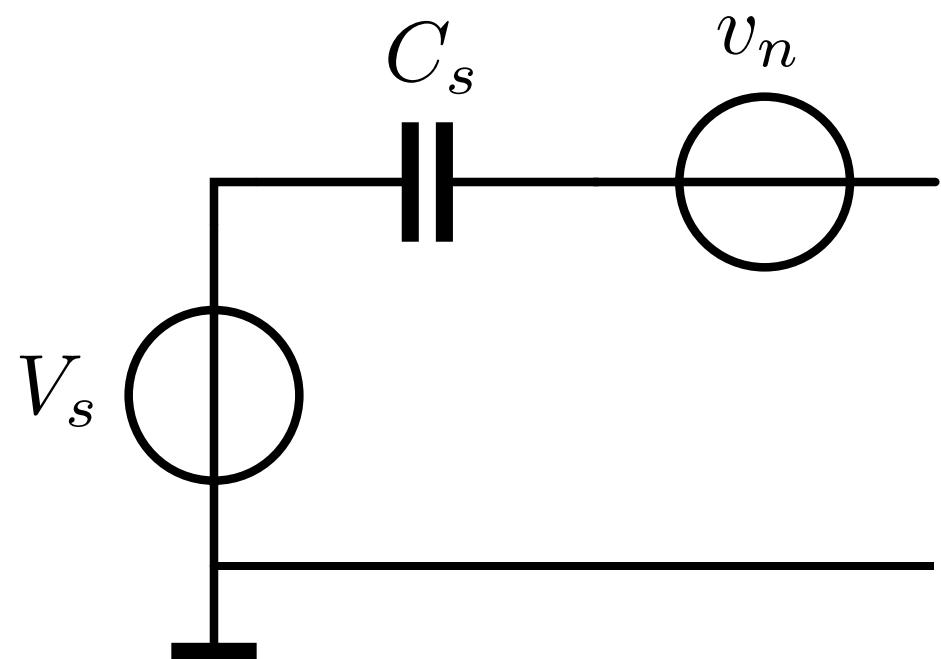
Similar as with resistive source:

$$S_{v_n} = \frac{4kTn\Gamma}{g_m} \left(1 + \frac{c_{iss}}{C_s}\right)^2 = \frac{2kTn\Gamma}{\pi f_T c_{iss}} \left(1 + \frac{c_{iss}}{C_s}\right)^2$$

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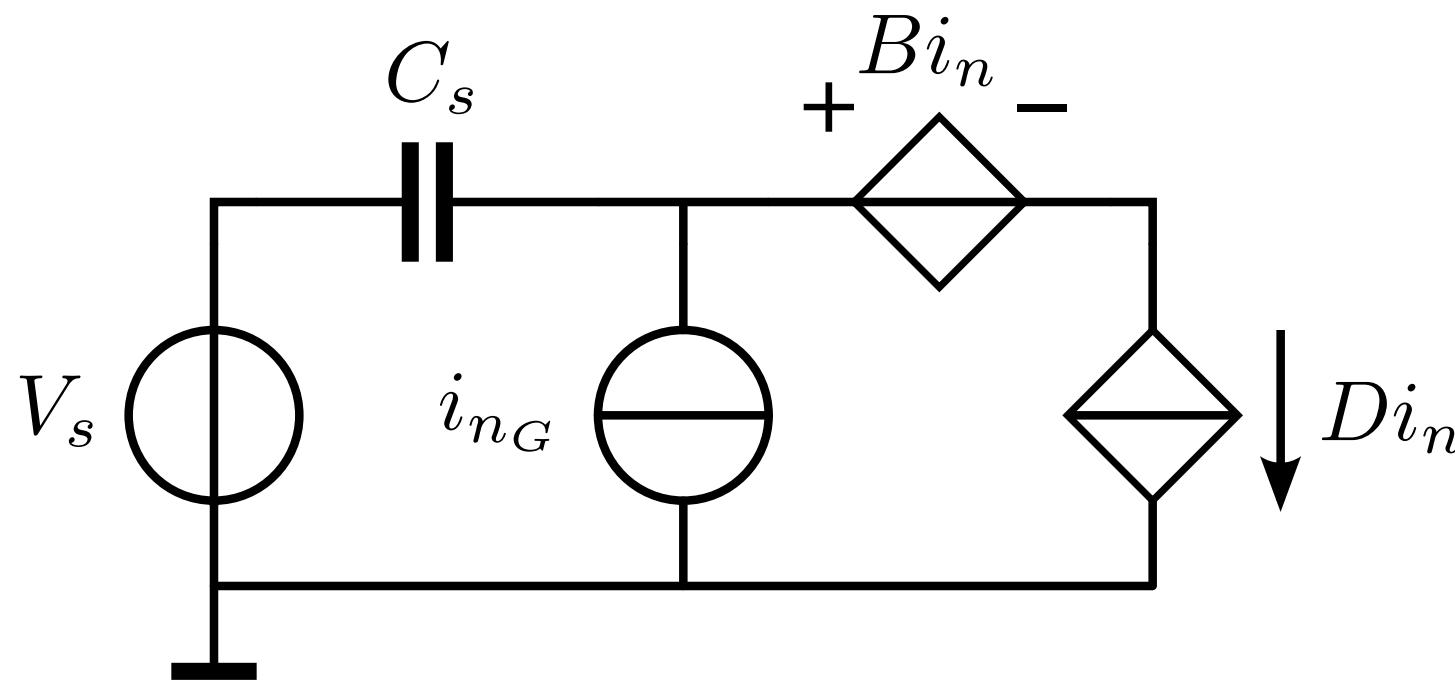
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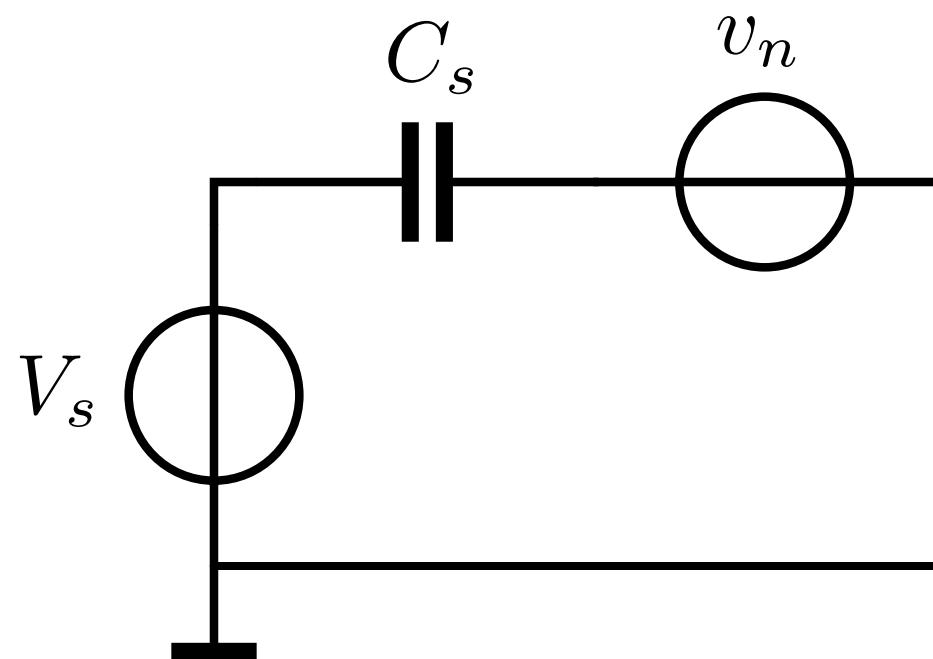
Similar as with resistive source:

Increase W and maintain IC

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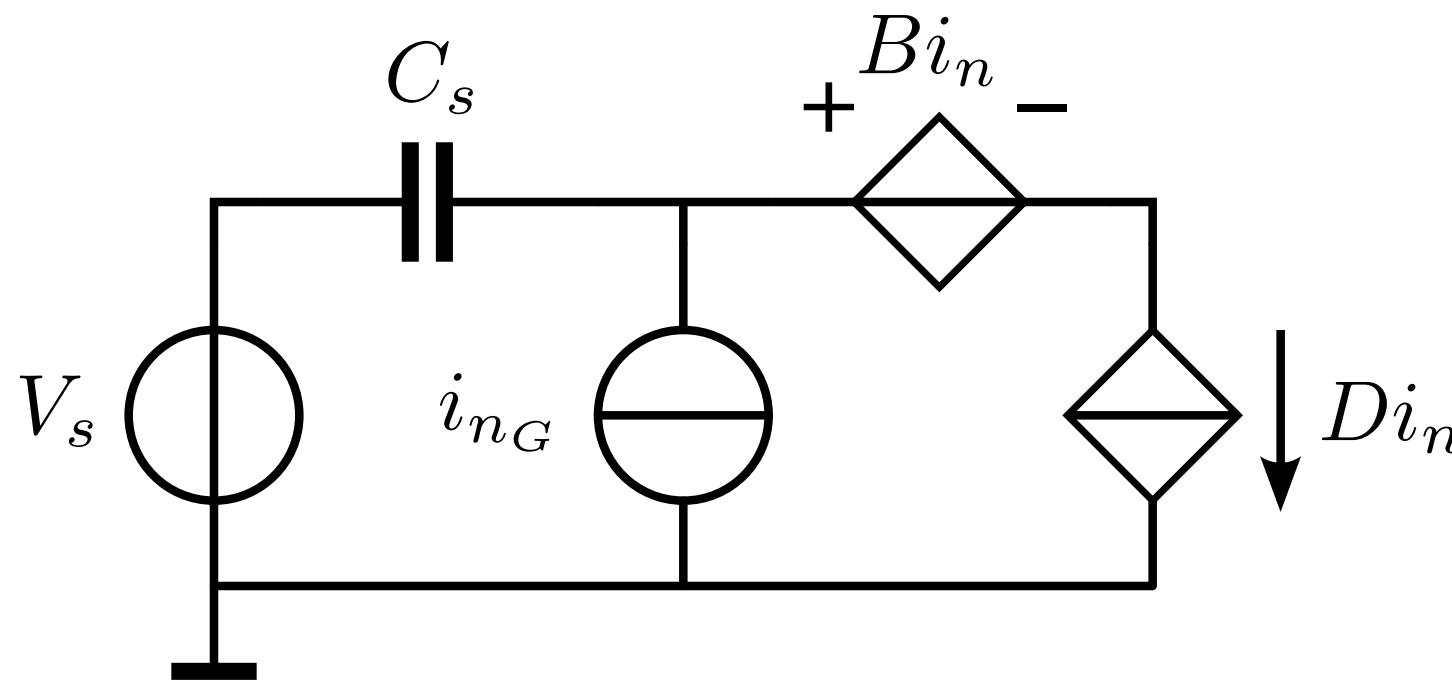
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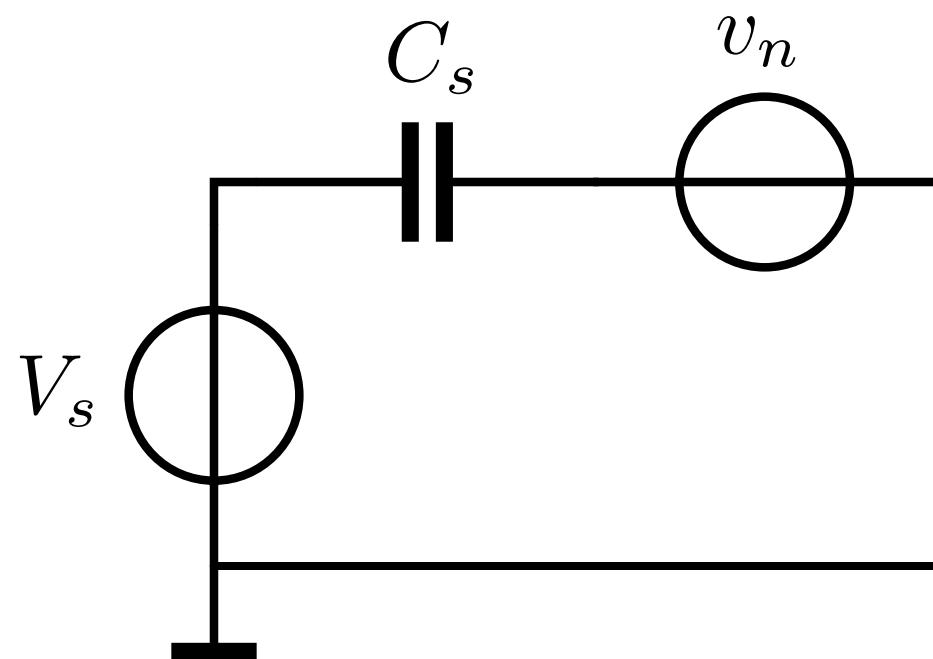


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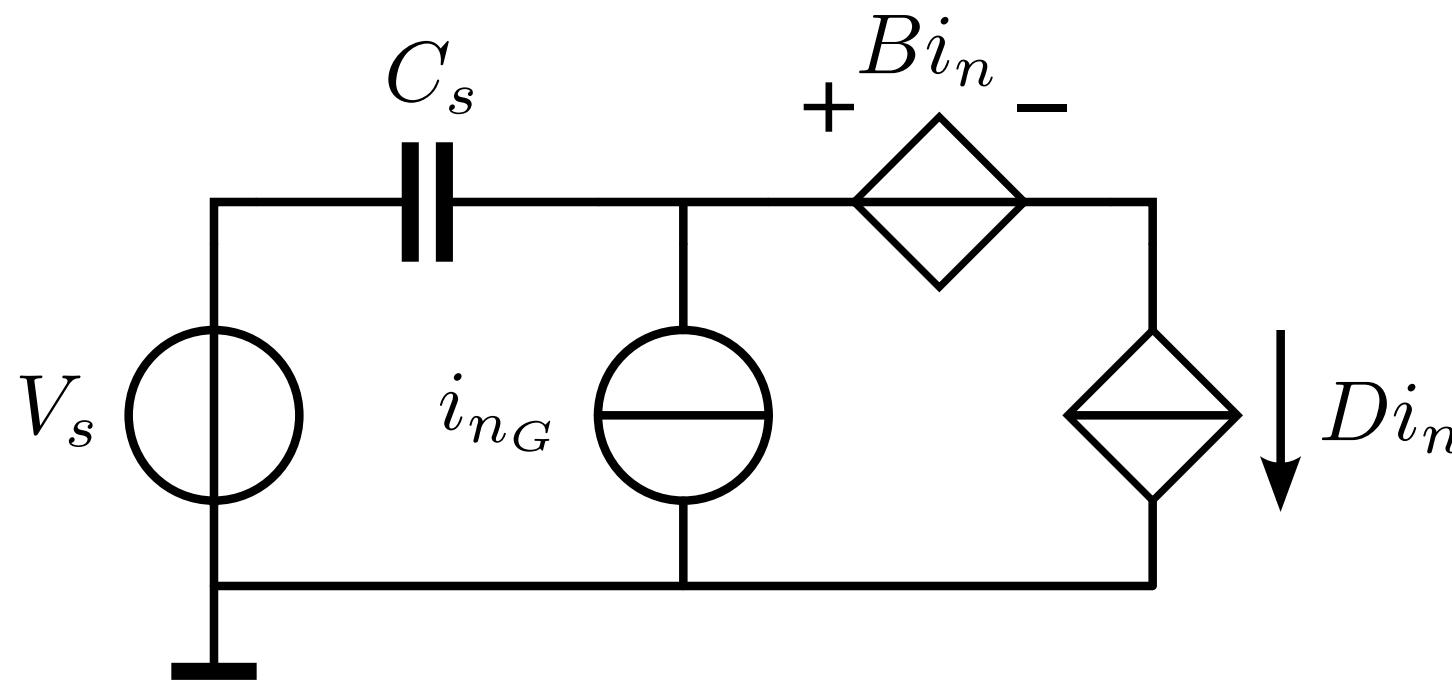
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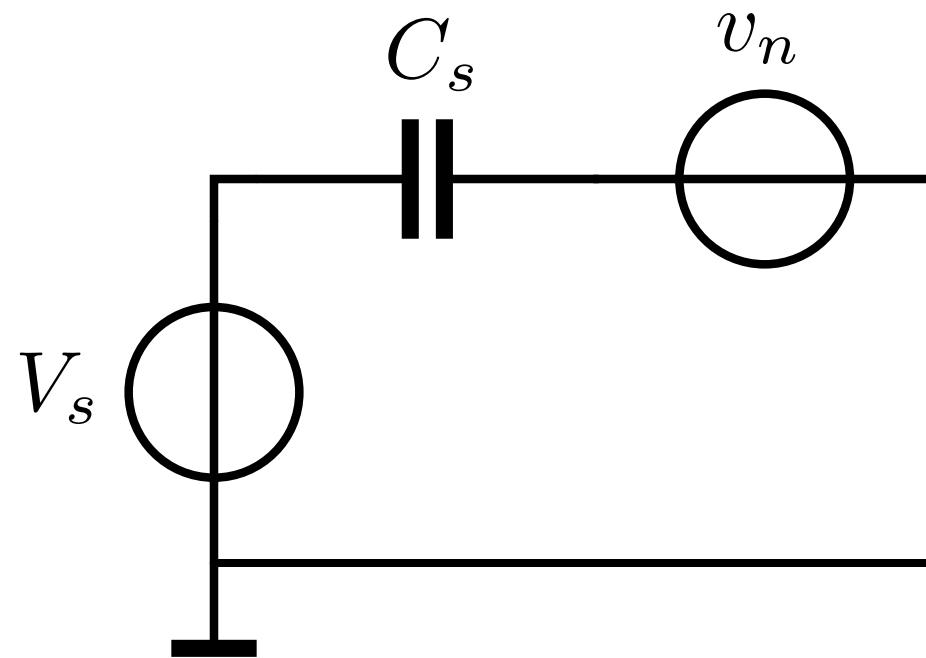


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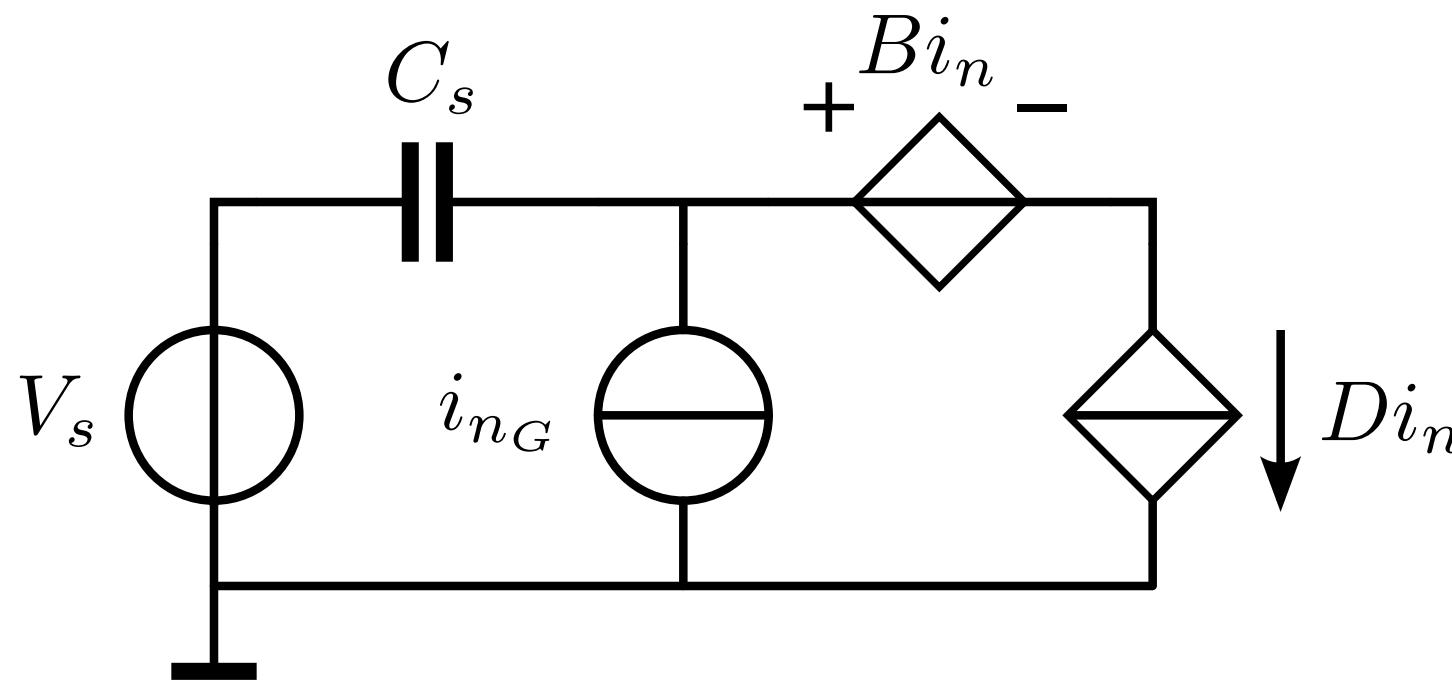
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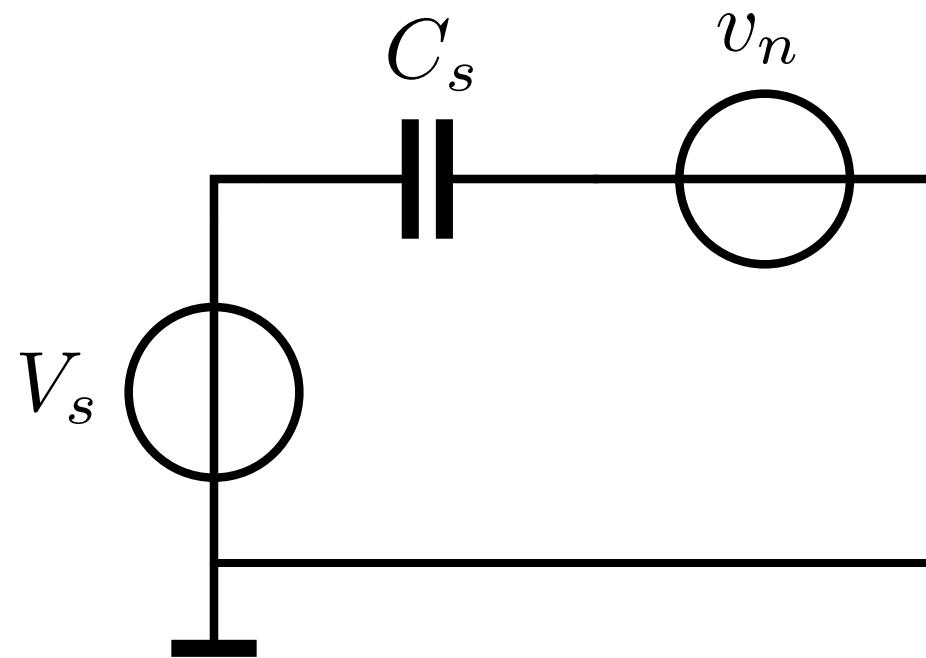
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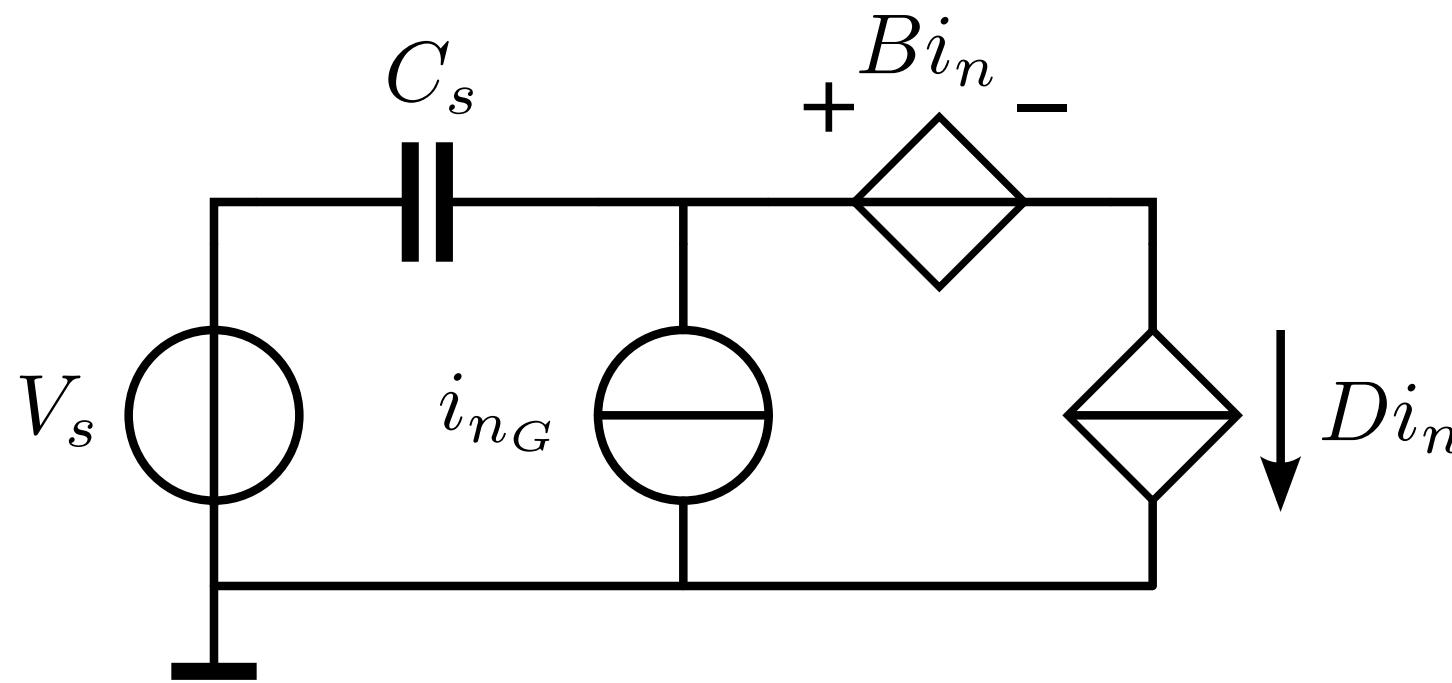


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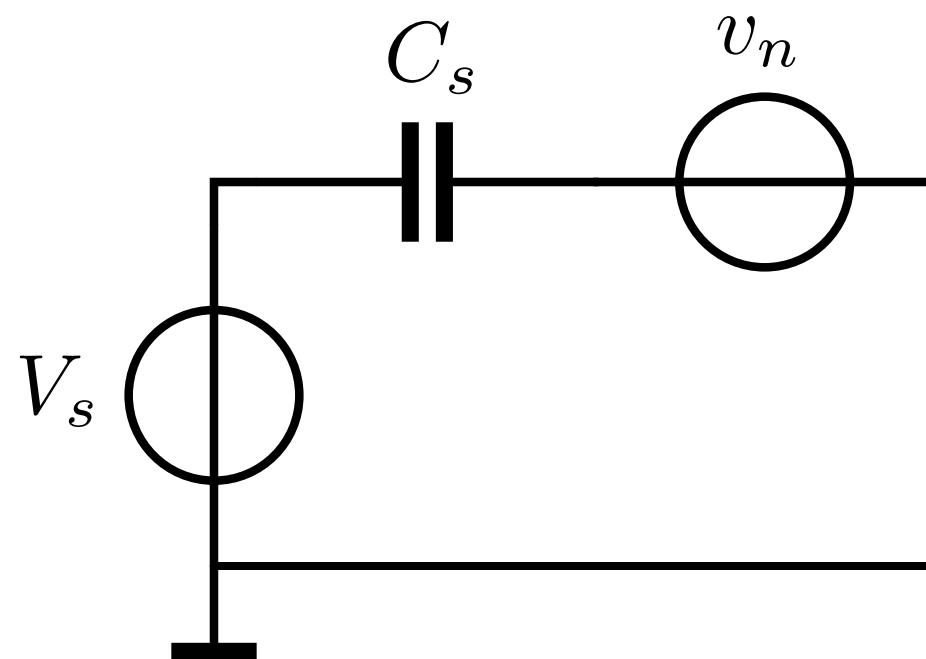


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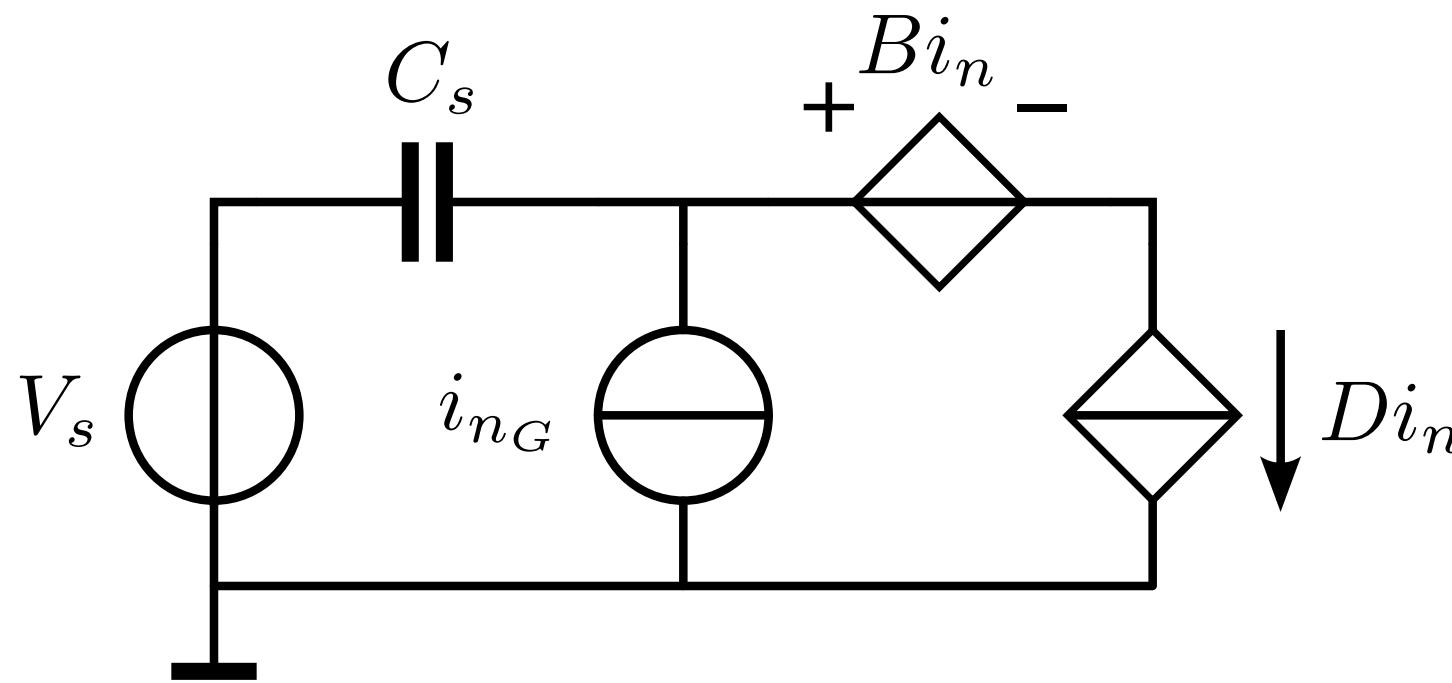
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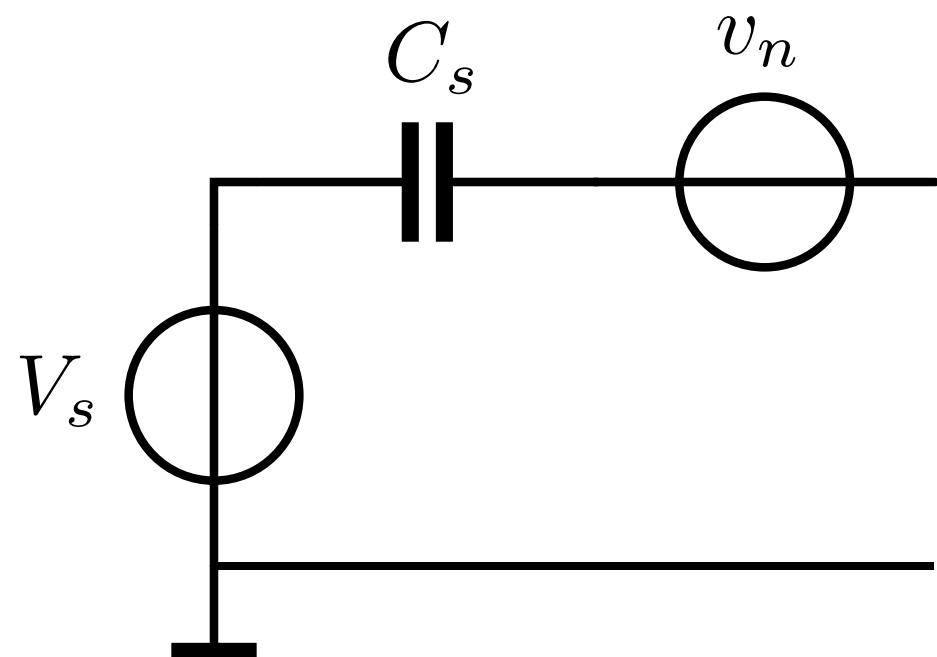


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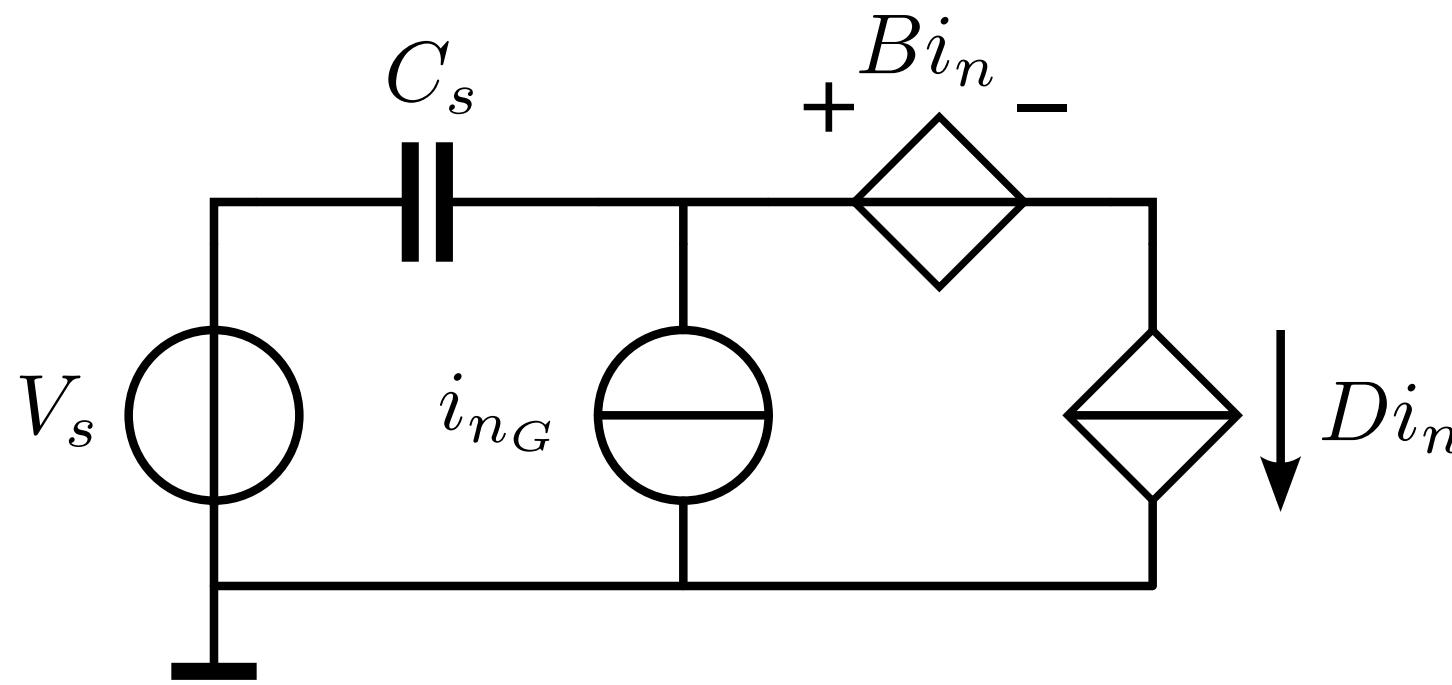


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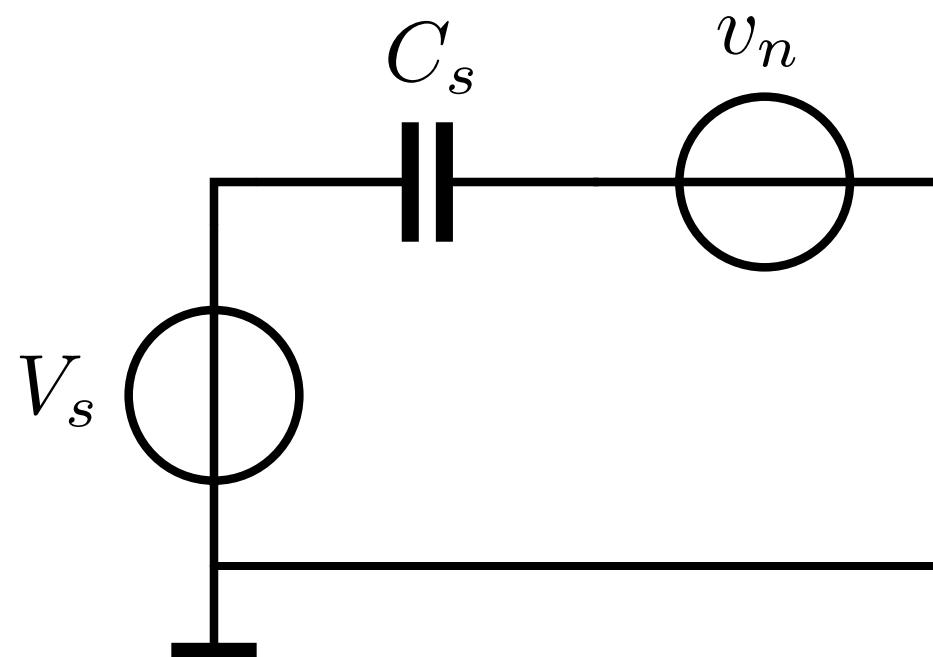


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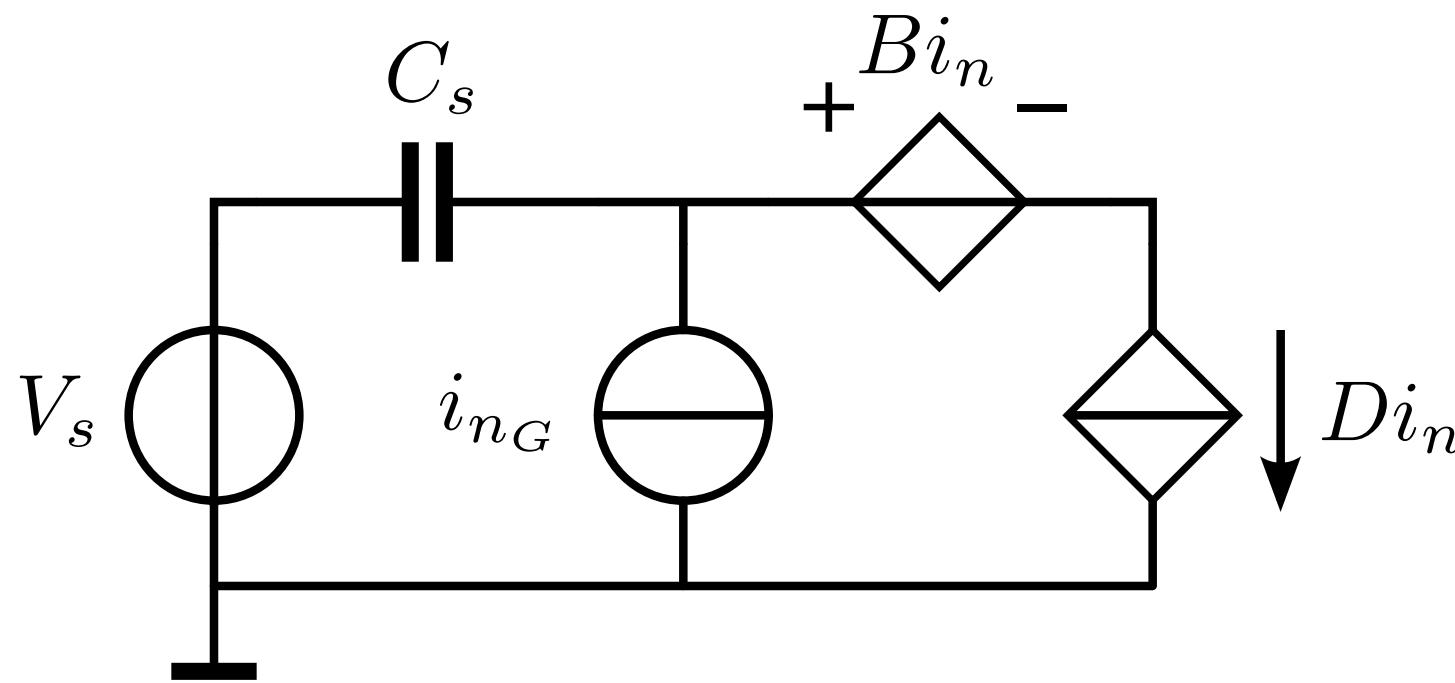
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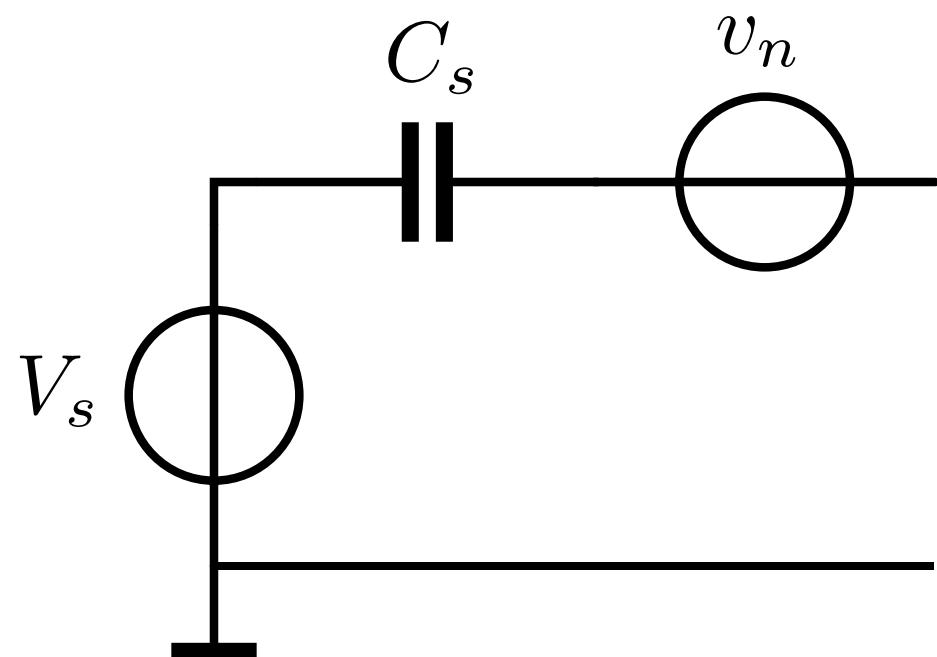


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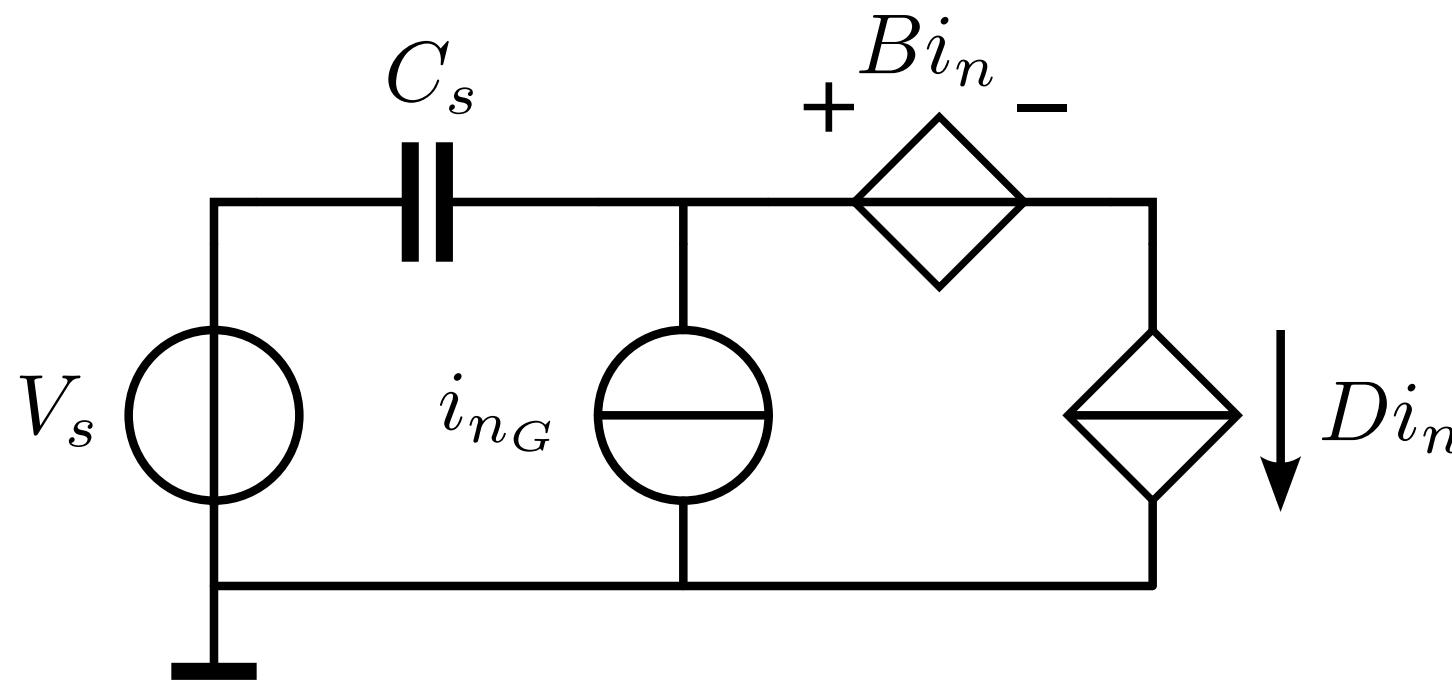
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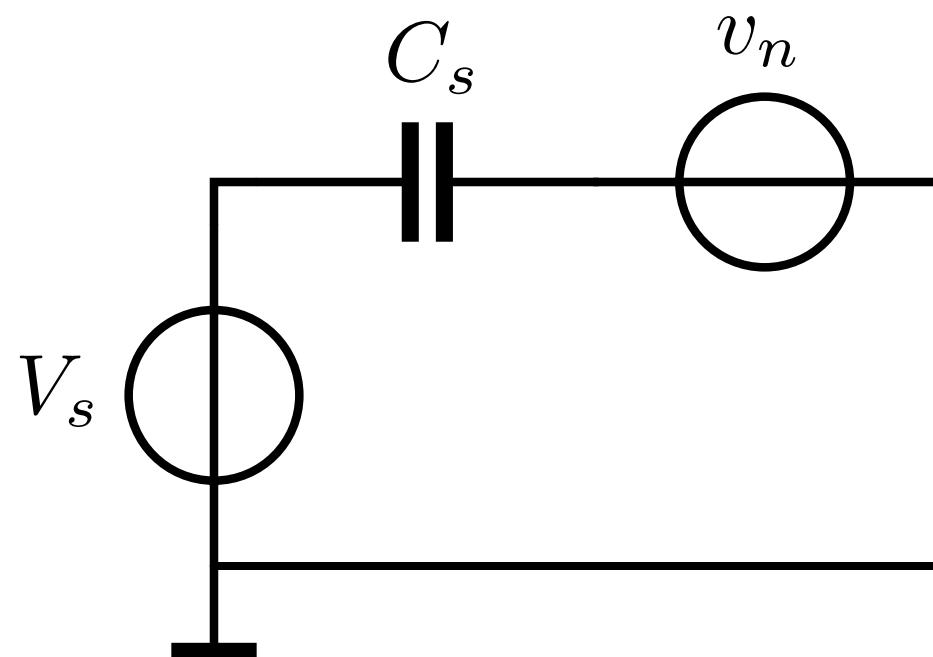


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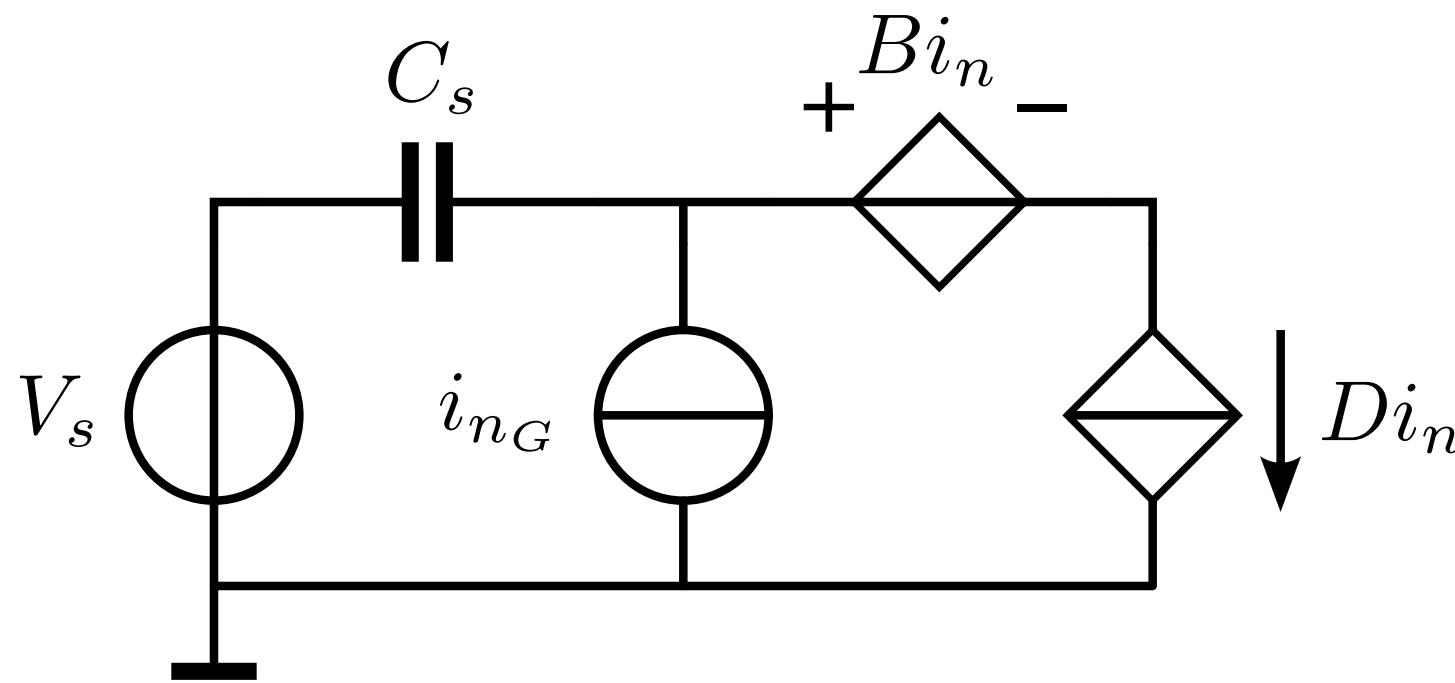
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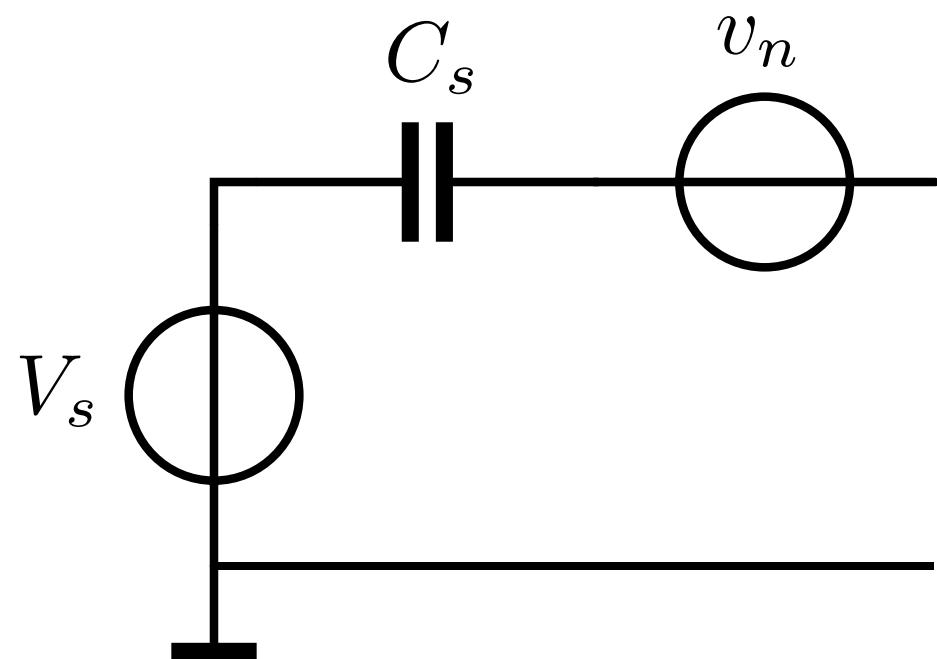


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