Structured Electronic Design

Quiz biasing techniques

Anton J.M. Montagne

Biasing Techniques

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Subtract it from the signal at that location

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Compare it with the desired value

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Compare it with the desired value
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BSc course structured electronic design:

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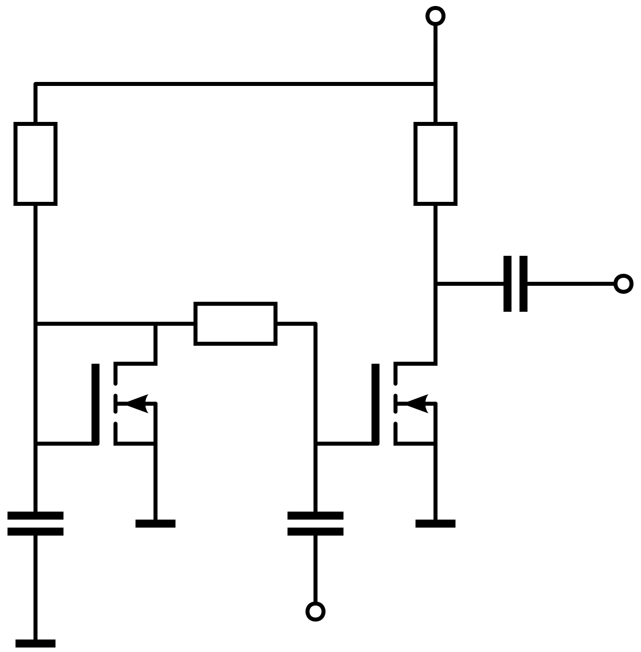

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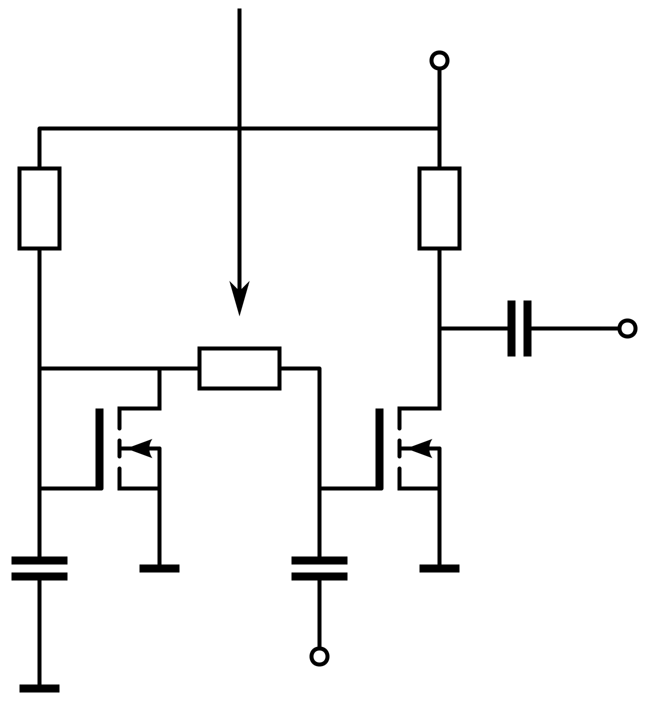

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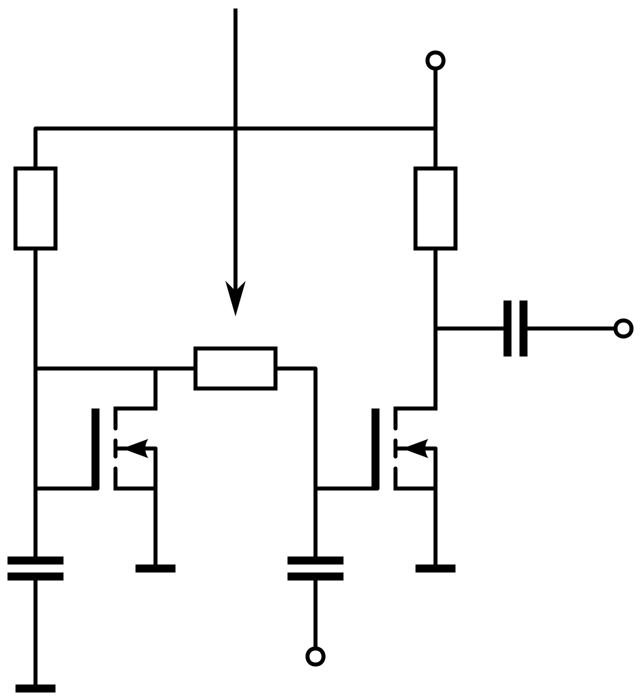

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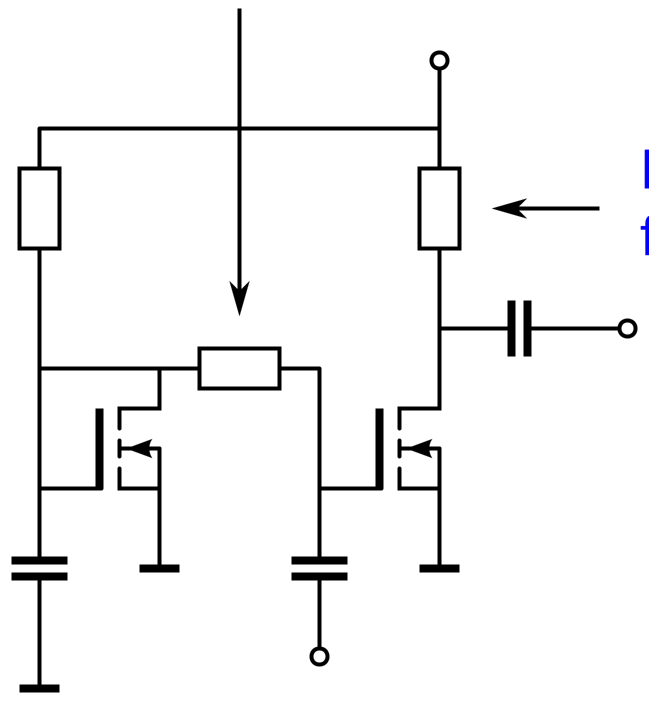

Brute-force fixing of the drain voltage for a given drain current:

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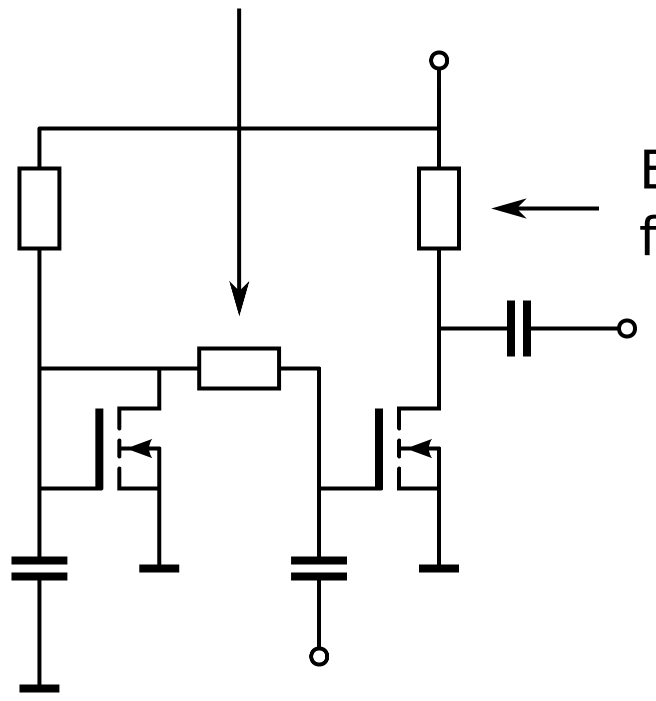

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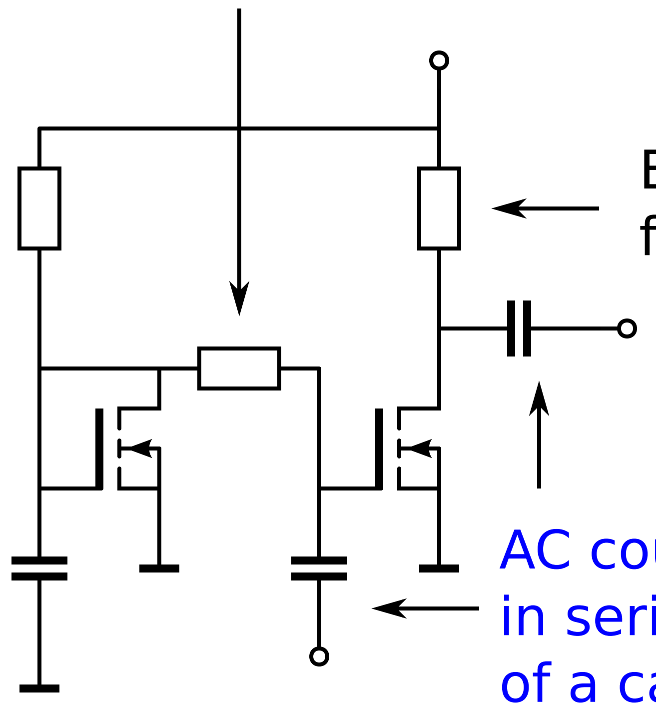

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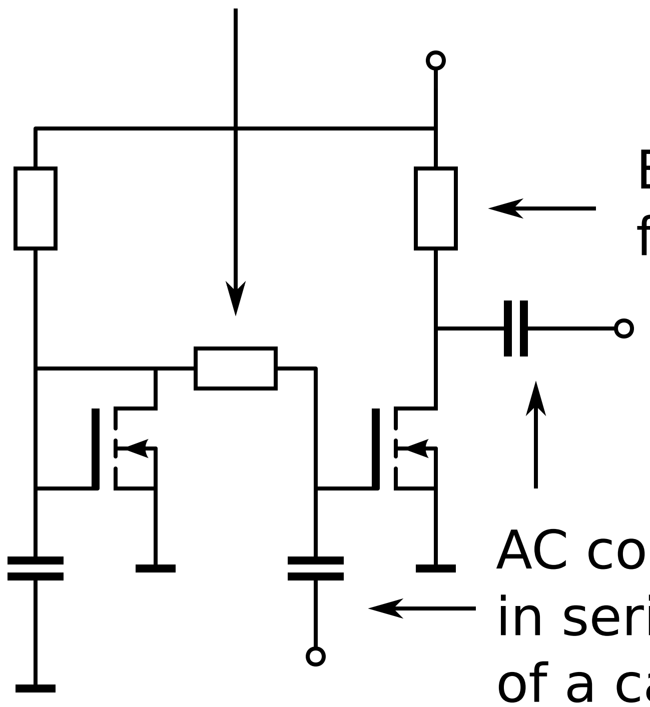

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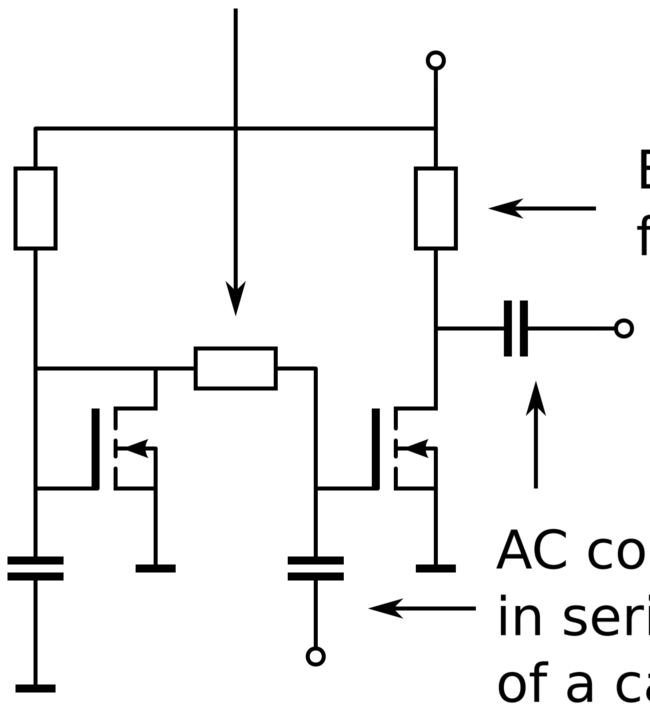

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Application of Compensation

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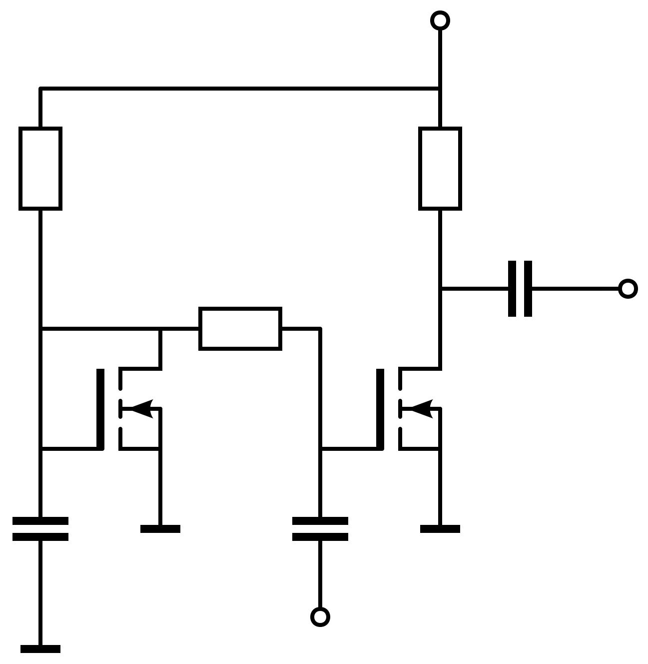
- Limited improvement: imperfect reproduction (matching error):



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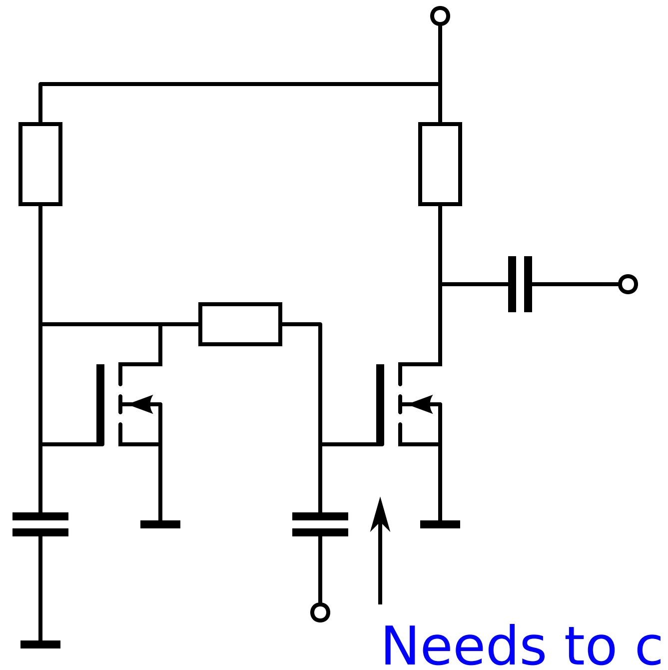

Needs to change with temperature to ensure
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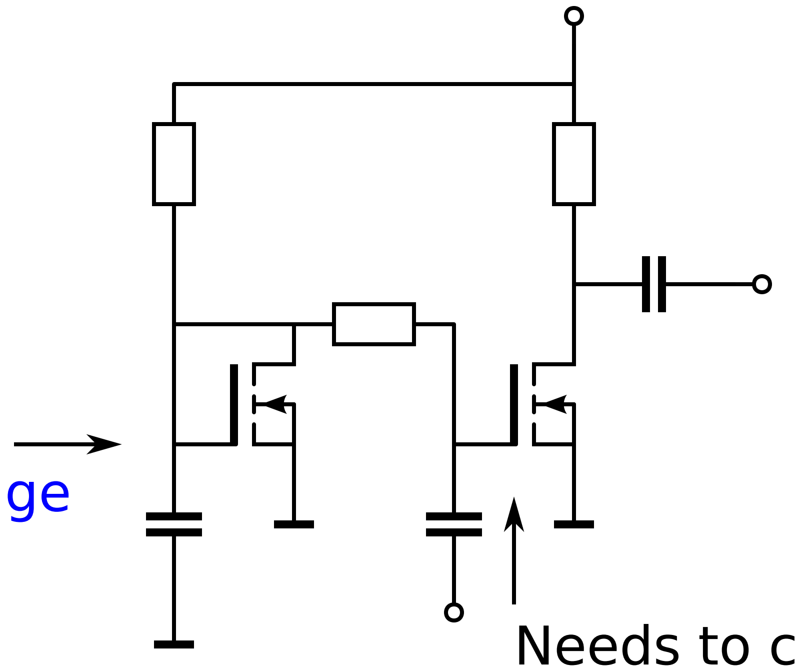
Generates the temperature-dependent gate-source voltage



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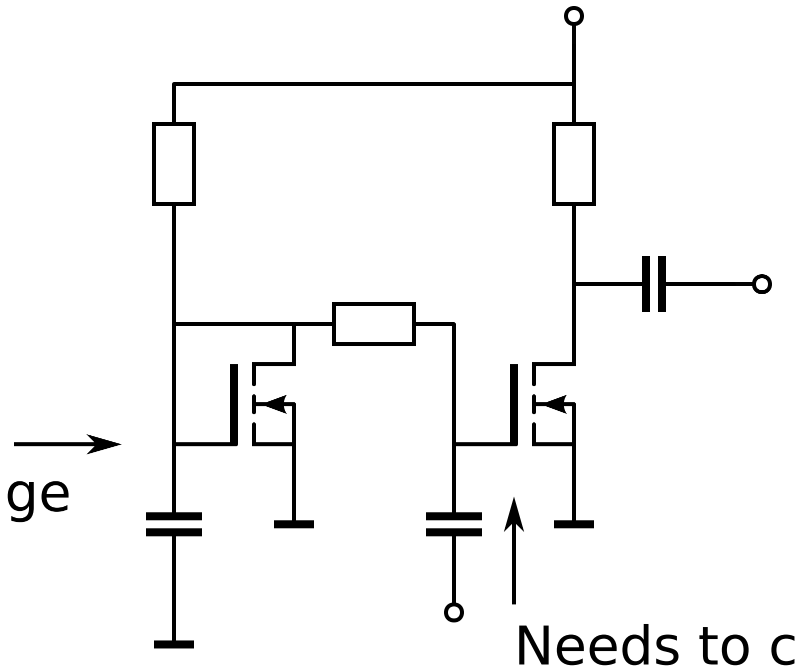

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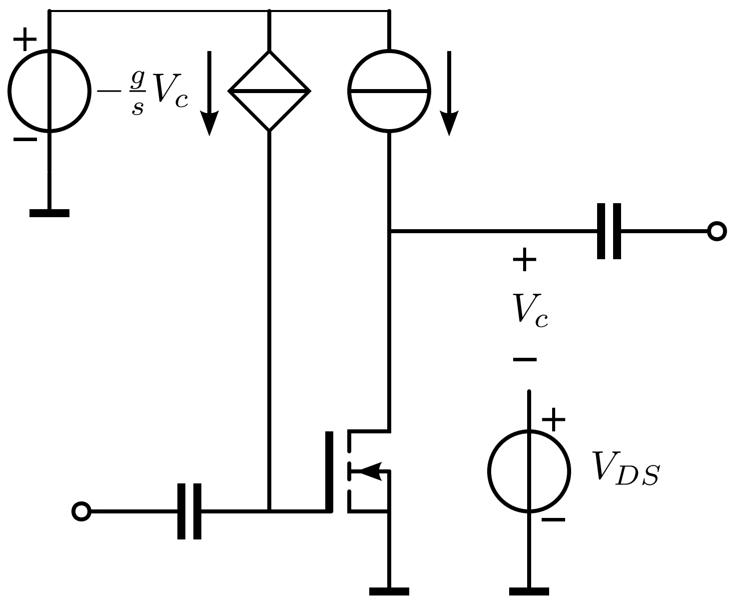

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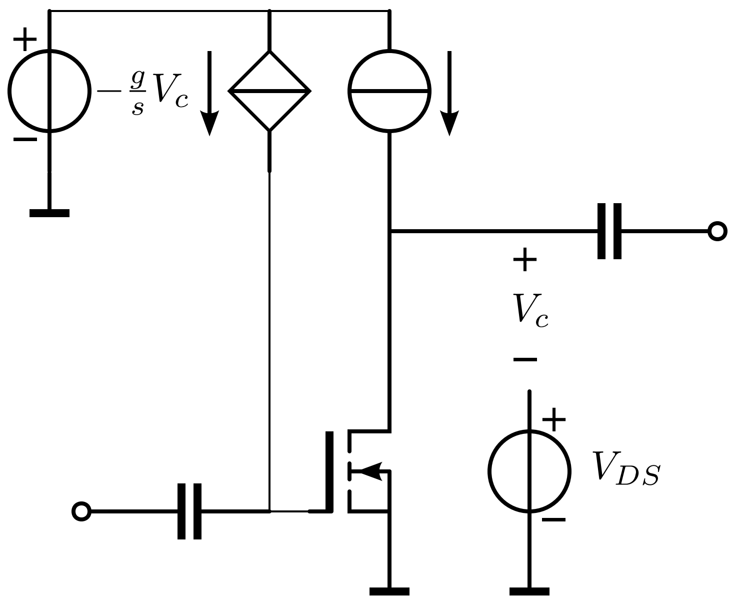

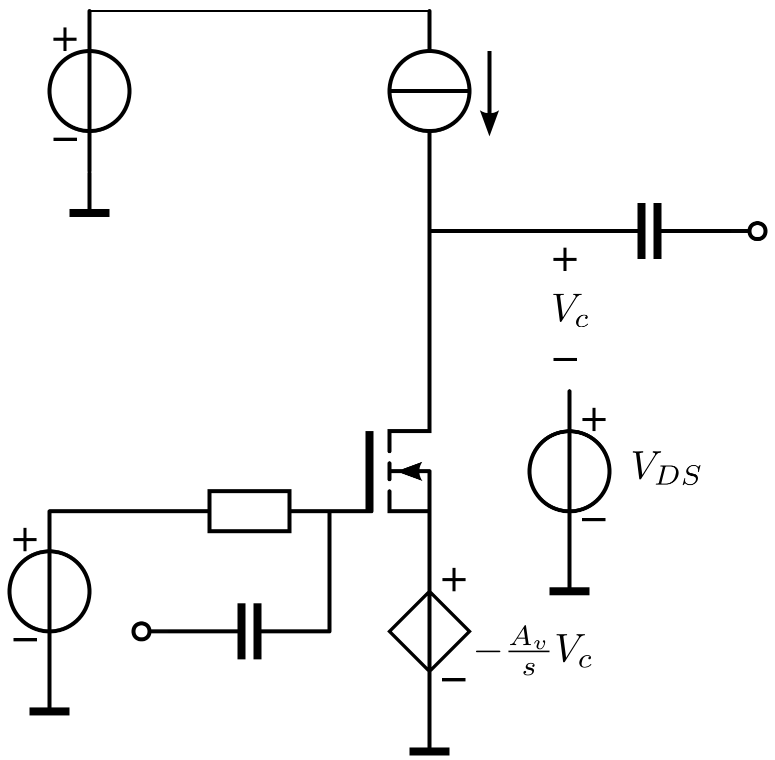

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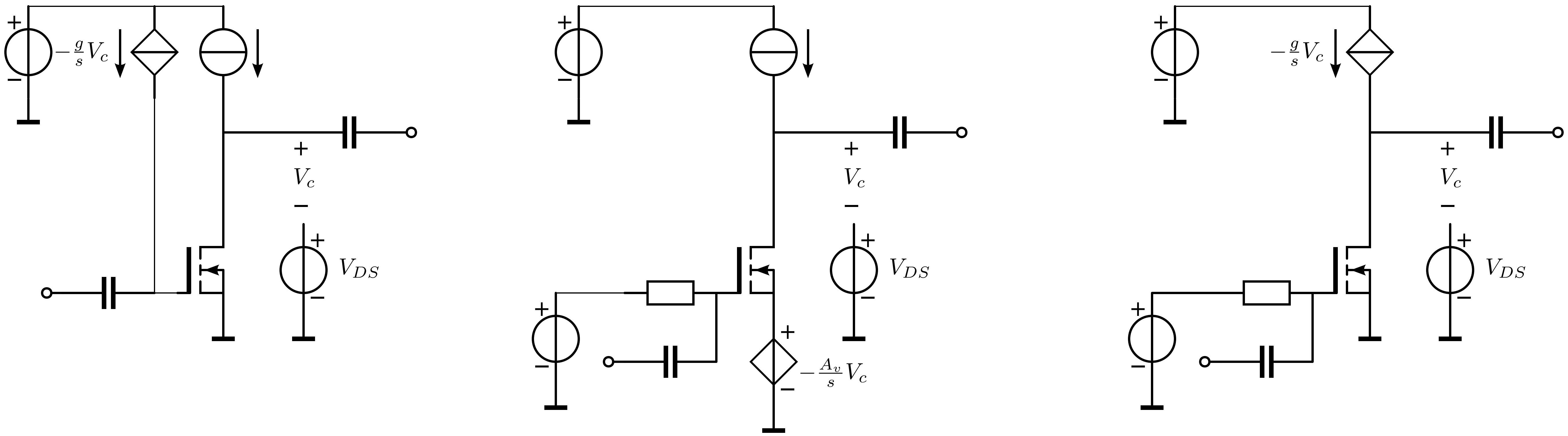

Electronic self inductance

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At low frequencies: low impedance in parallel with the signal path

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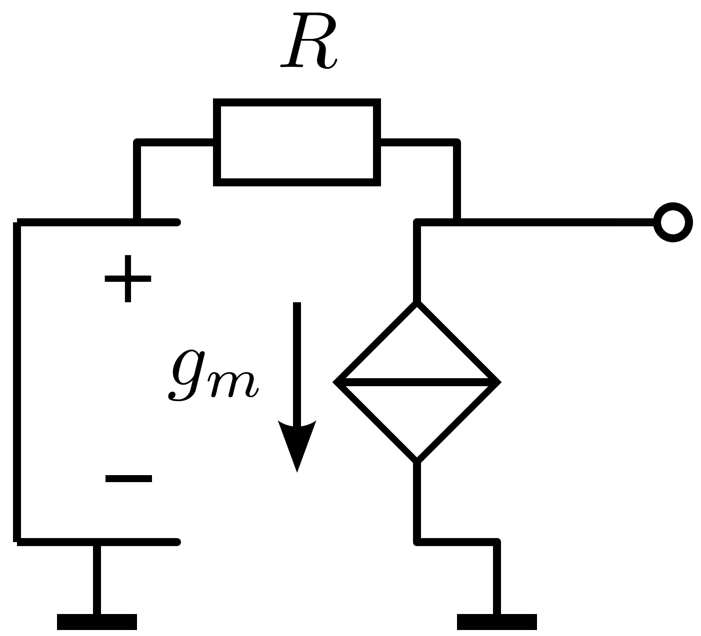

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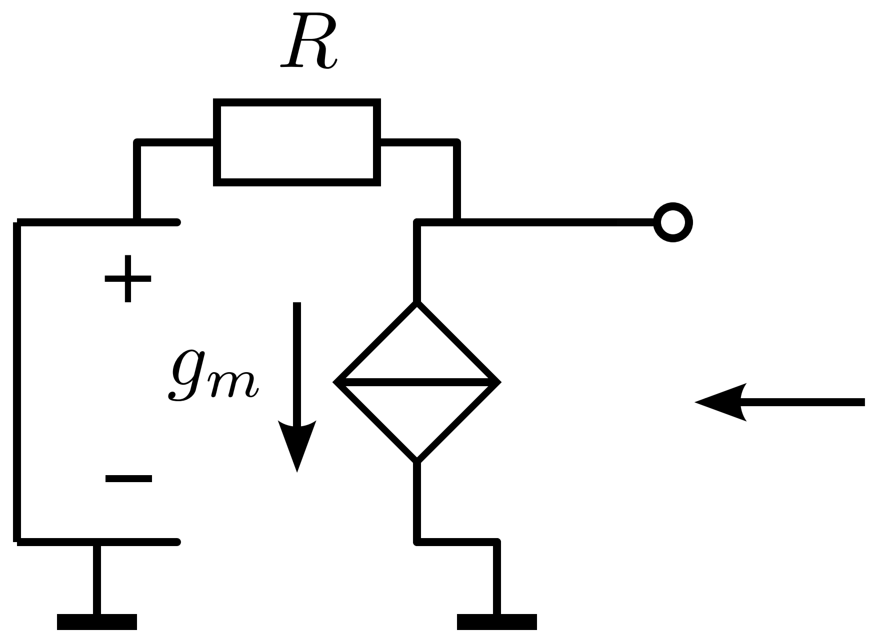

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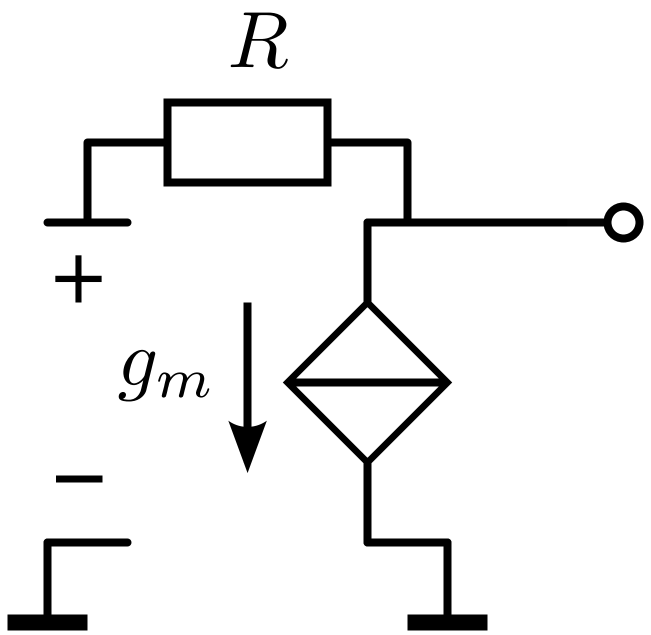

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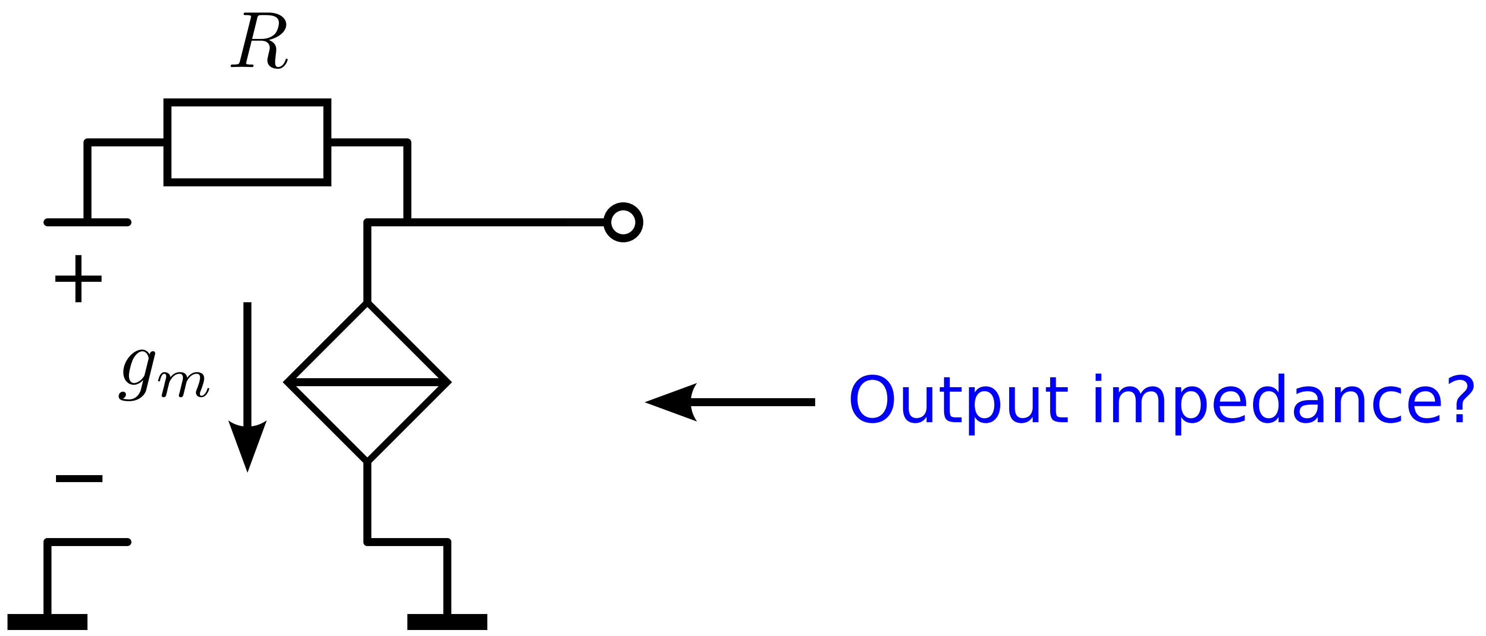

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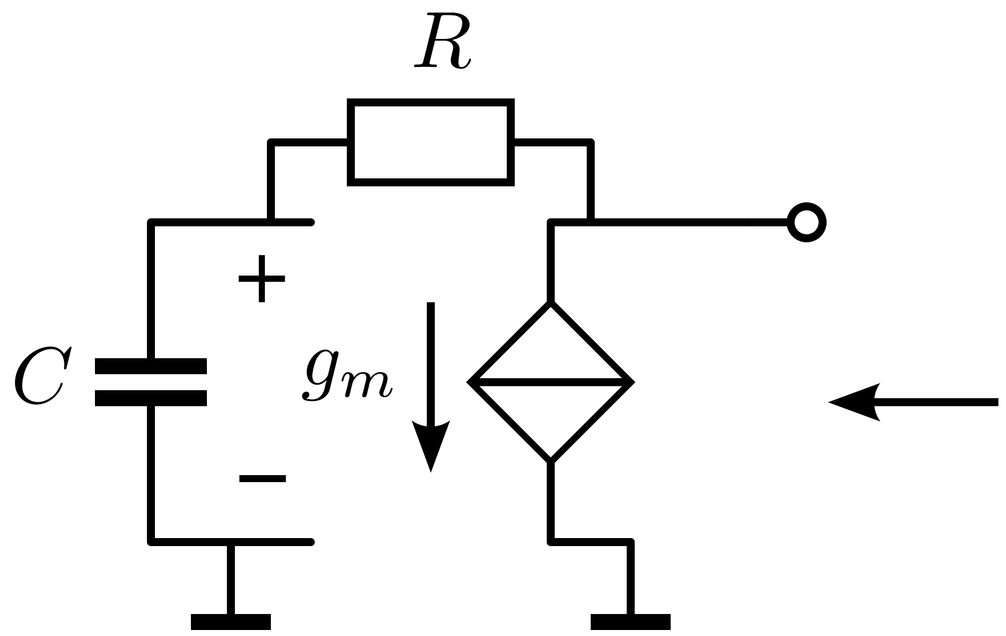

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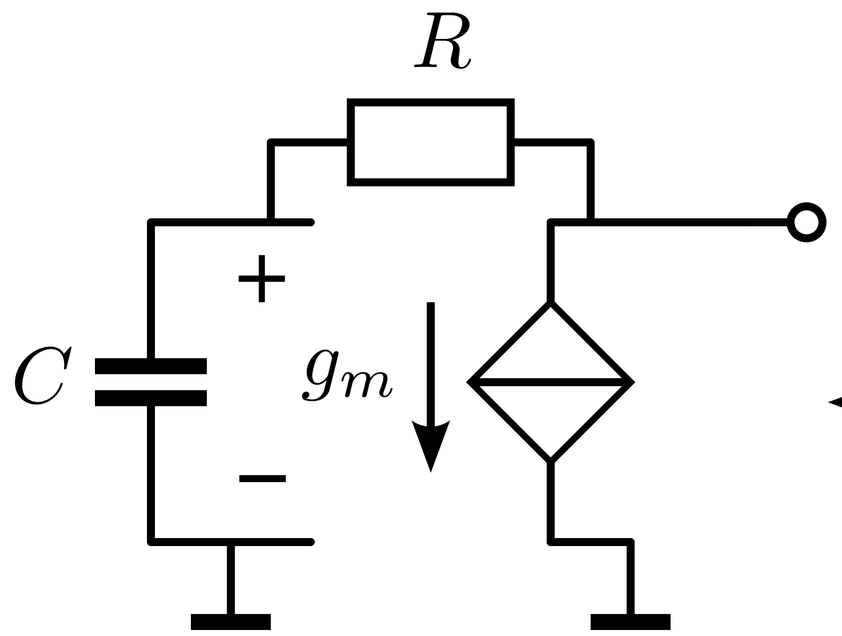
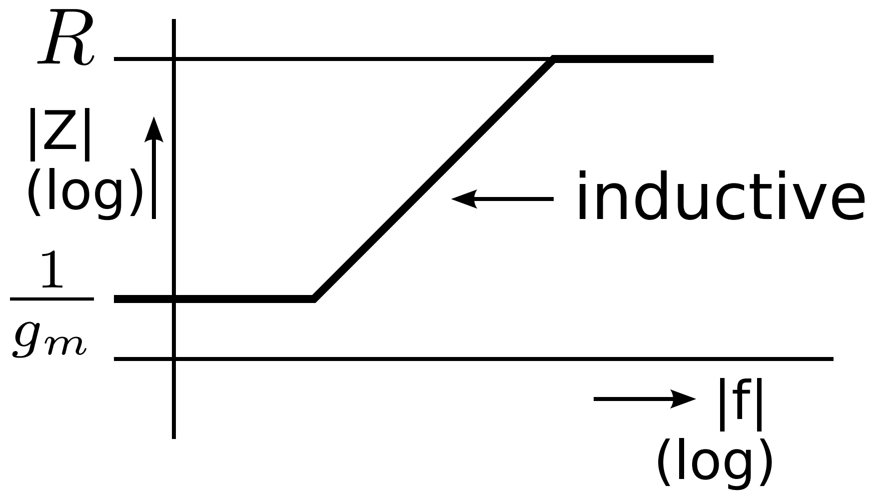


$\frac{1+sRC}{g_m+sC}$



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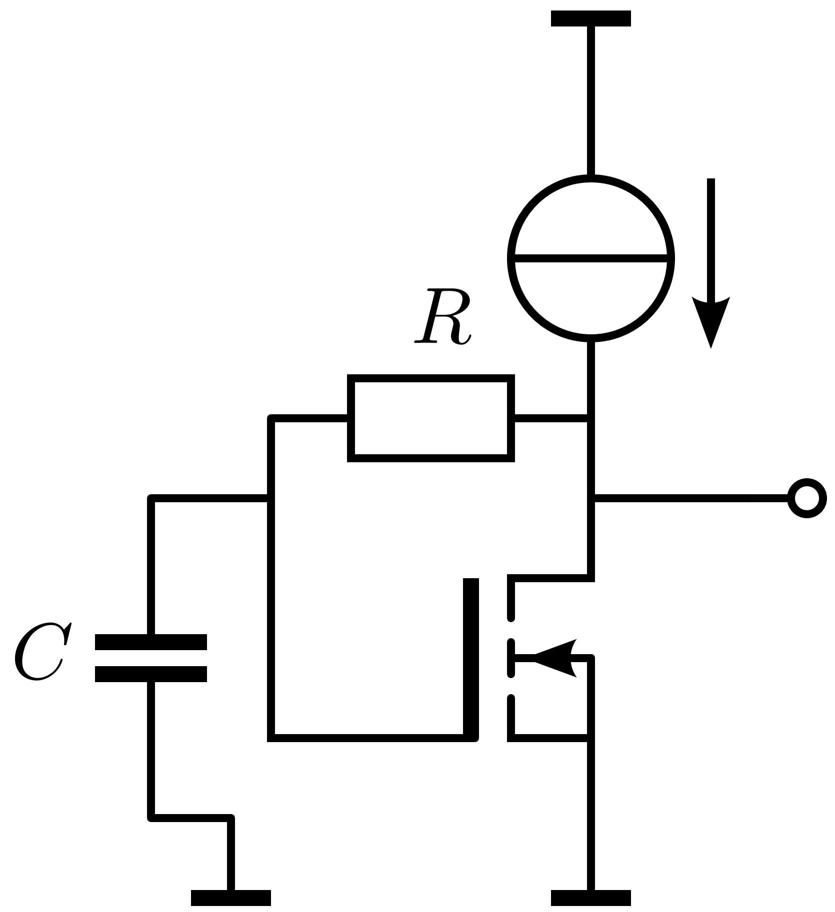

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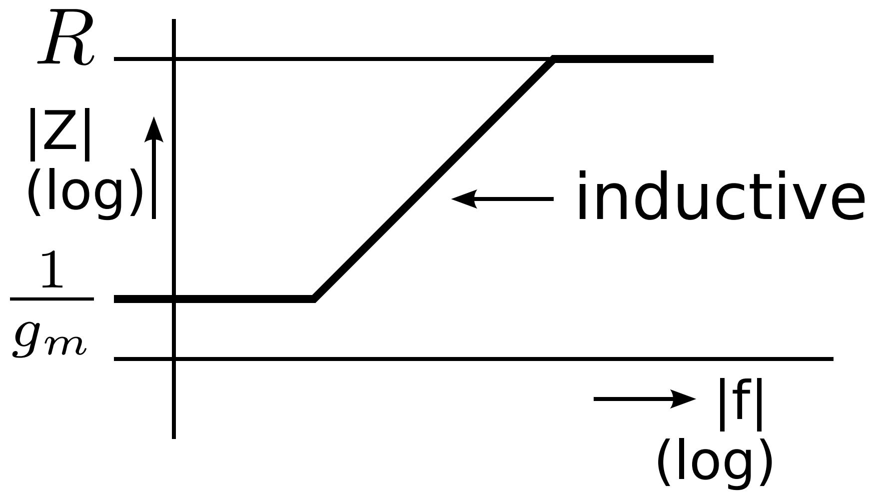
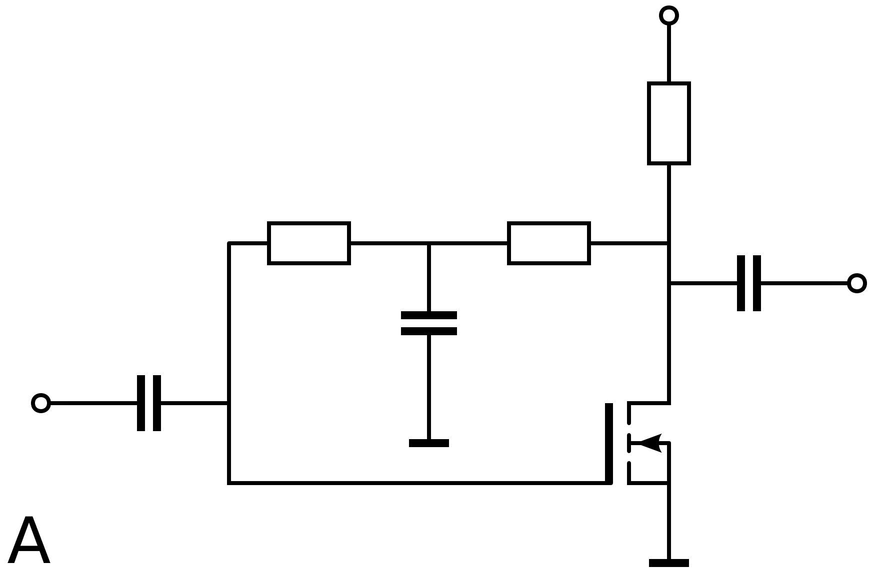
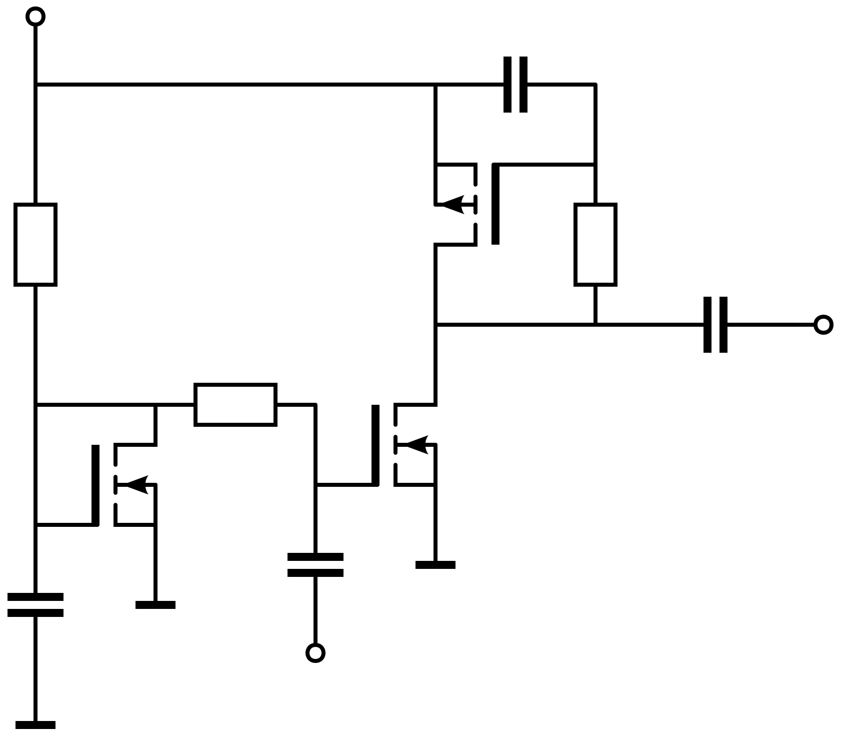


Some examples



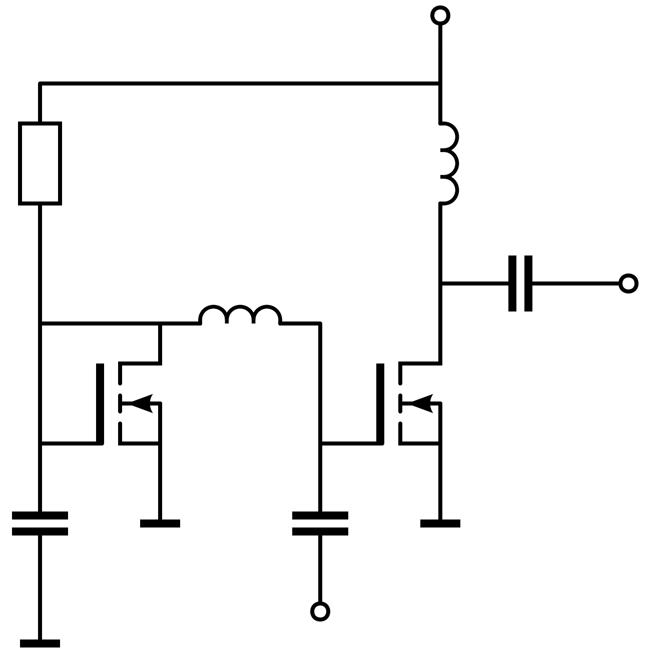
A



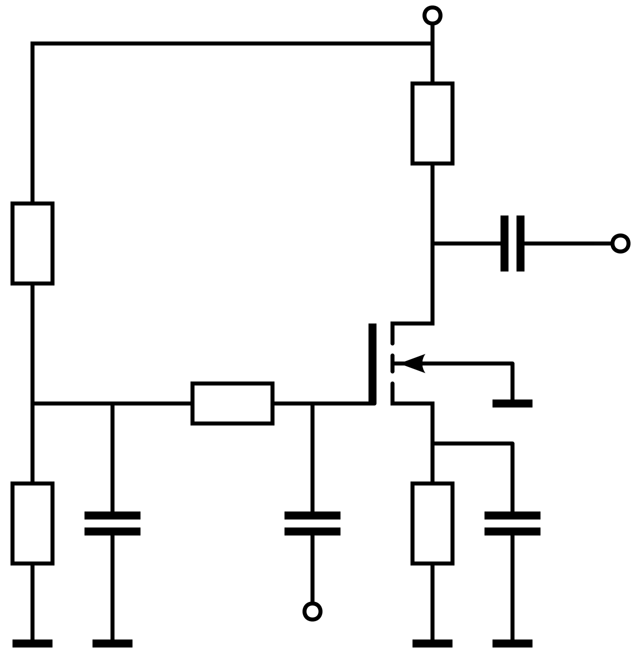
B

Applied techniques

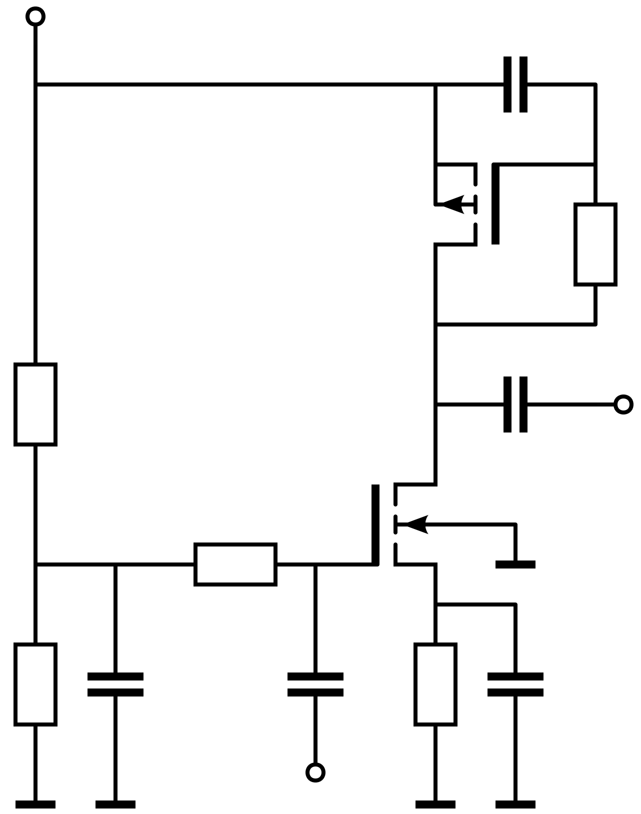
1. compensation
2. model-based biasing
3. brute force technique
4. negative feedback biasing
5. electronic self inductance



C



D



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