

Structured Electronic Design

Design Procedure
Negative Feedback Amplifier Types

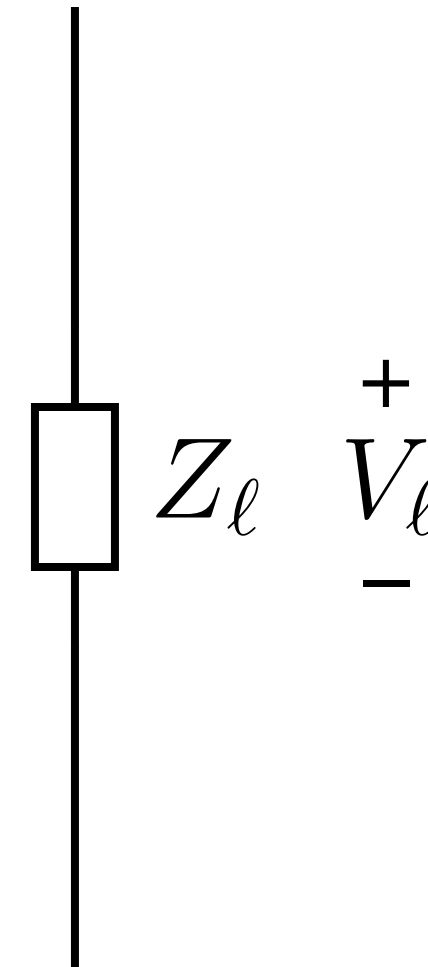
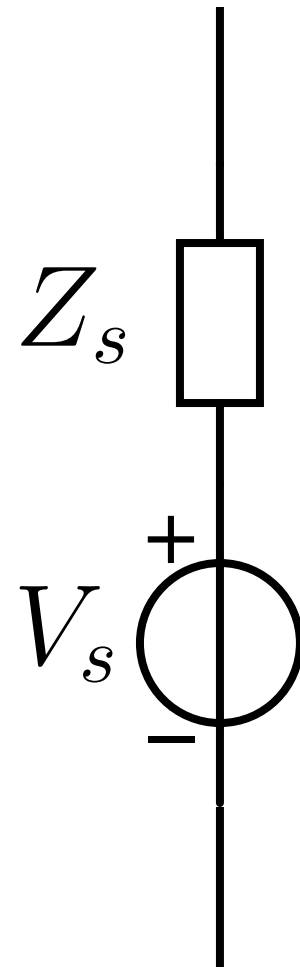
Anton J.M. Montagne

Negative Feedback Voltage Amplifier

Starting point

We would like to establish a transfer:

$$\frac{V_\ell}{V_s} = A_v$$



The Procedure

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1. Measure the load signal (V or I)

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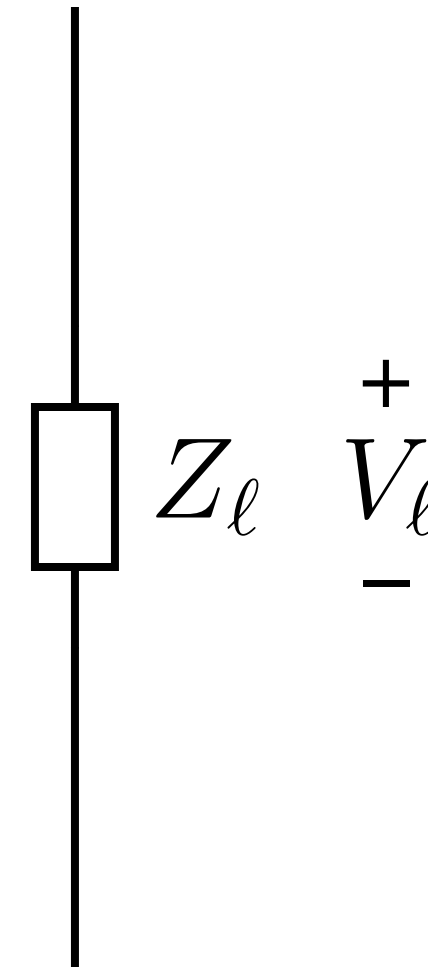
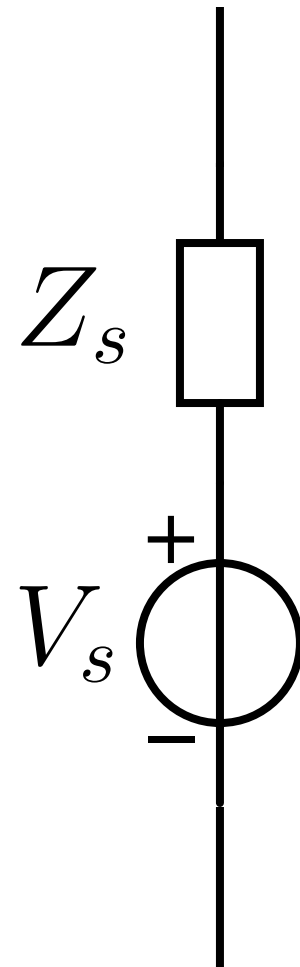
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1. Measure the voltage across the load



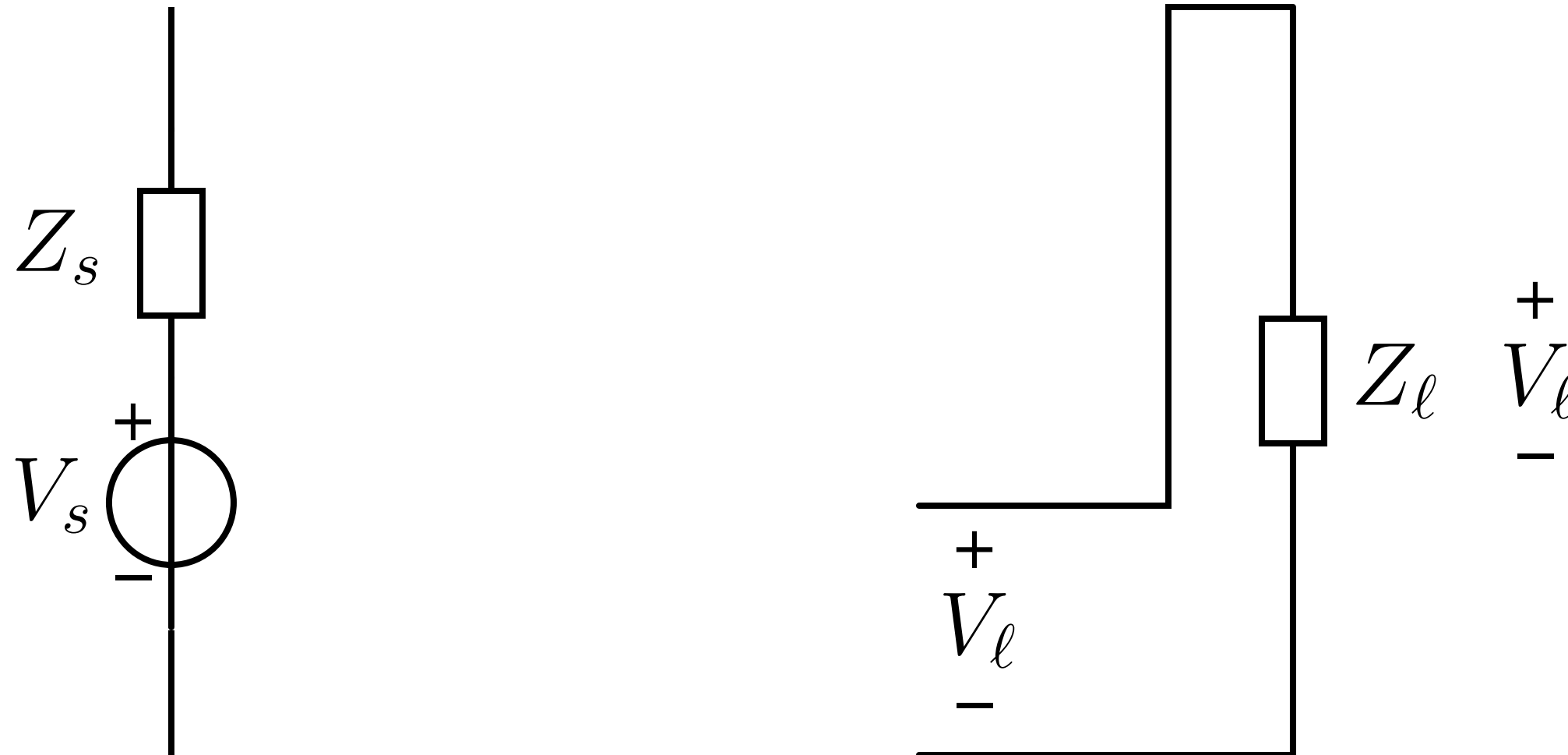
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 - a. Voltage should be measured across (in parallel with) the load
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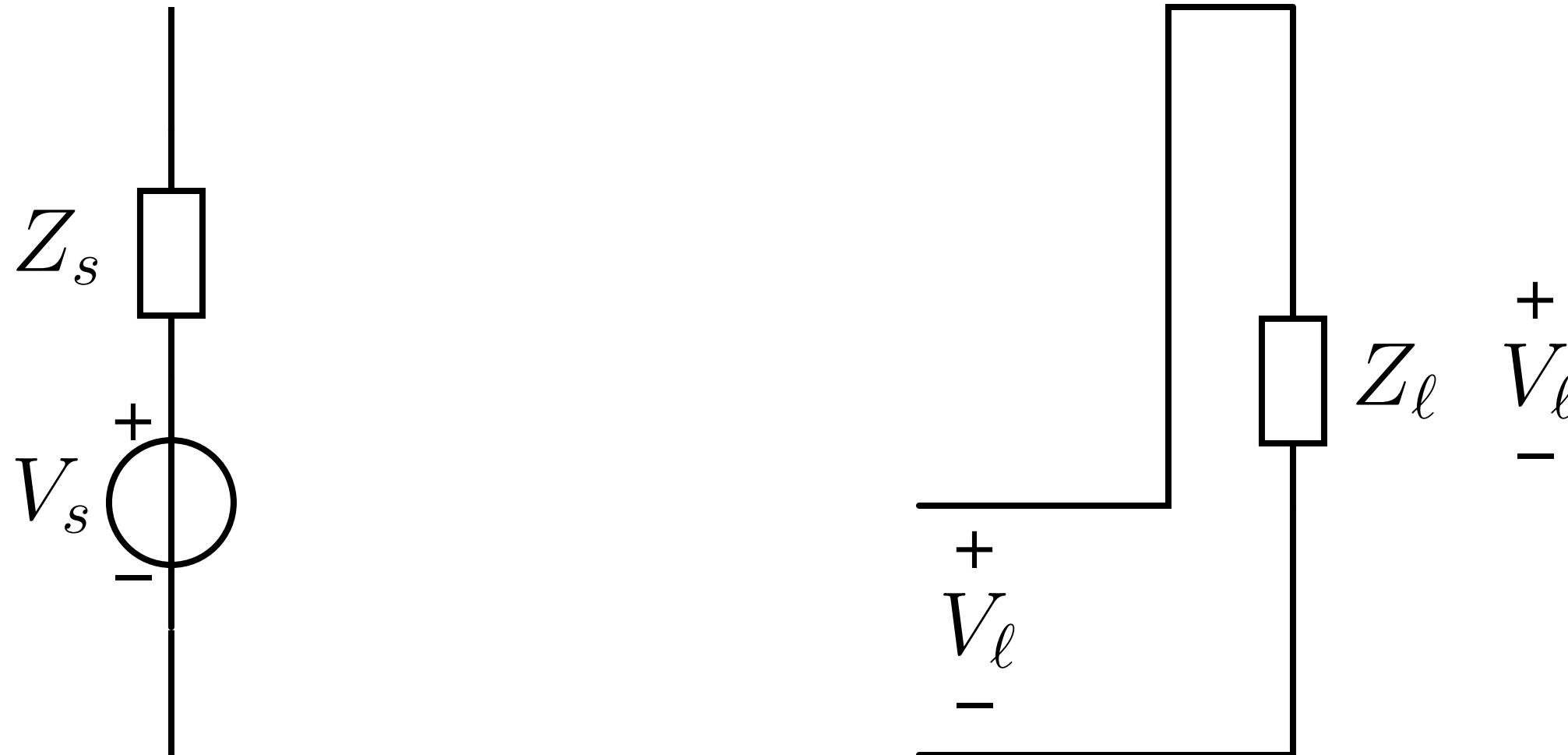
Negative Feedback Voltage Amplifier

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1. Measure the voltage across the load
2. Generate a copy of the source voltage from V_ℓ



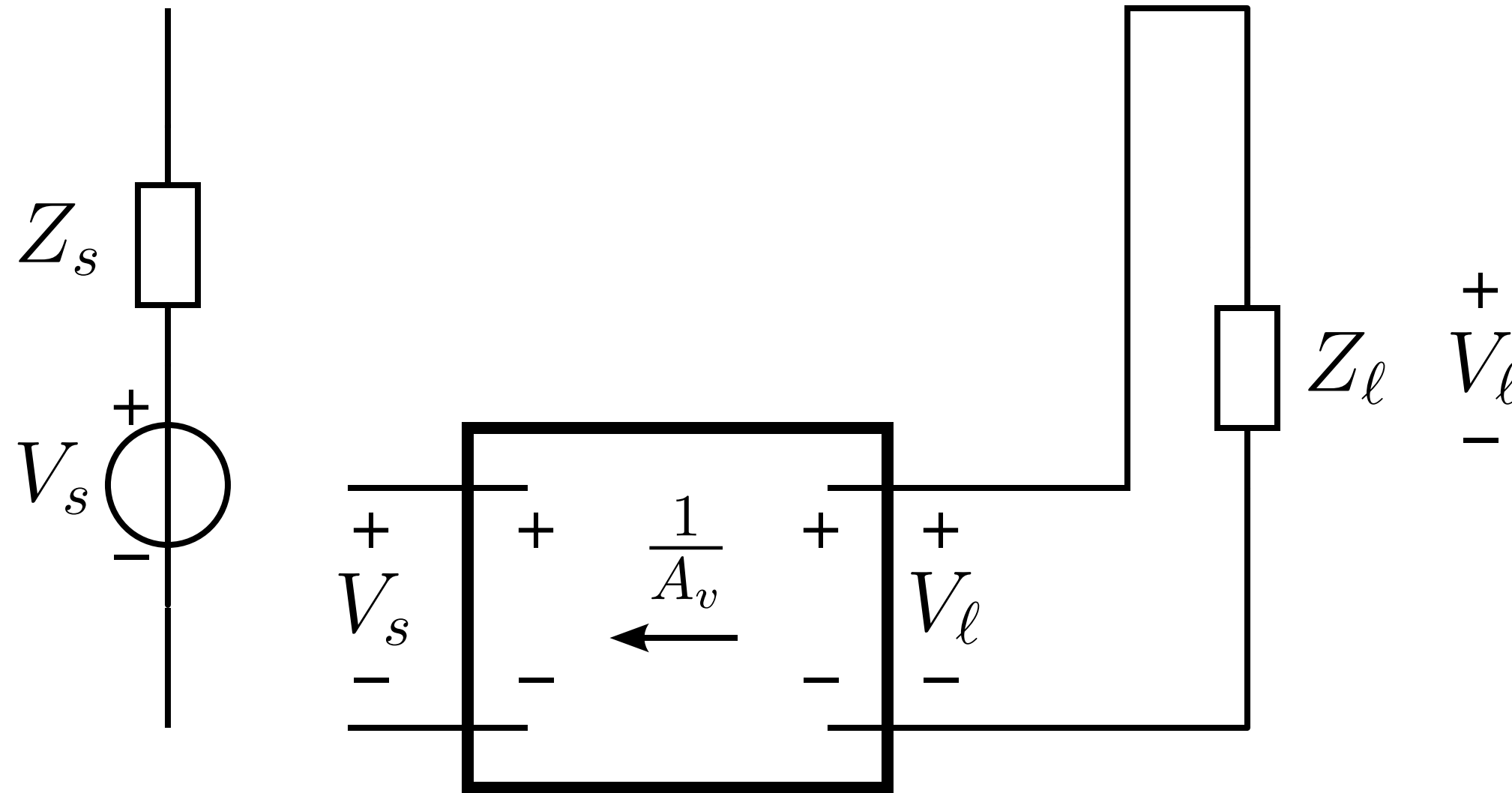
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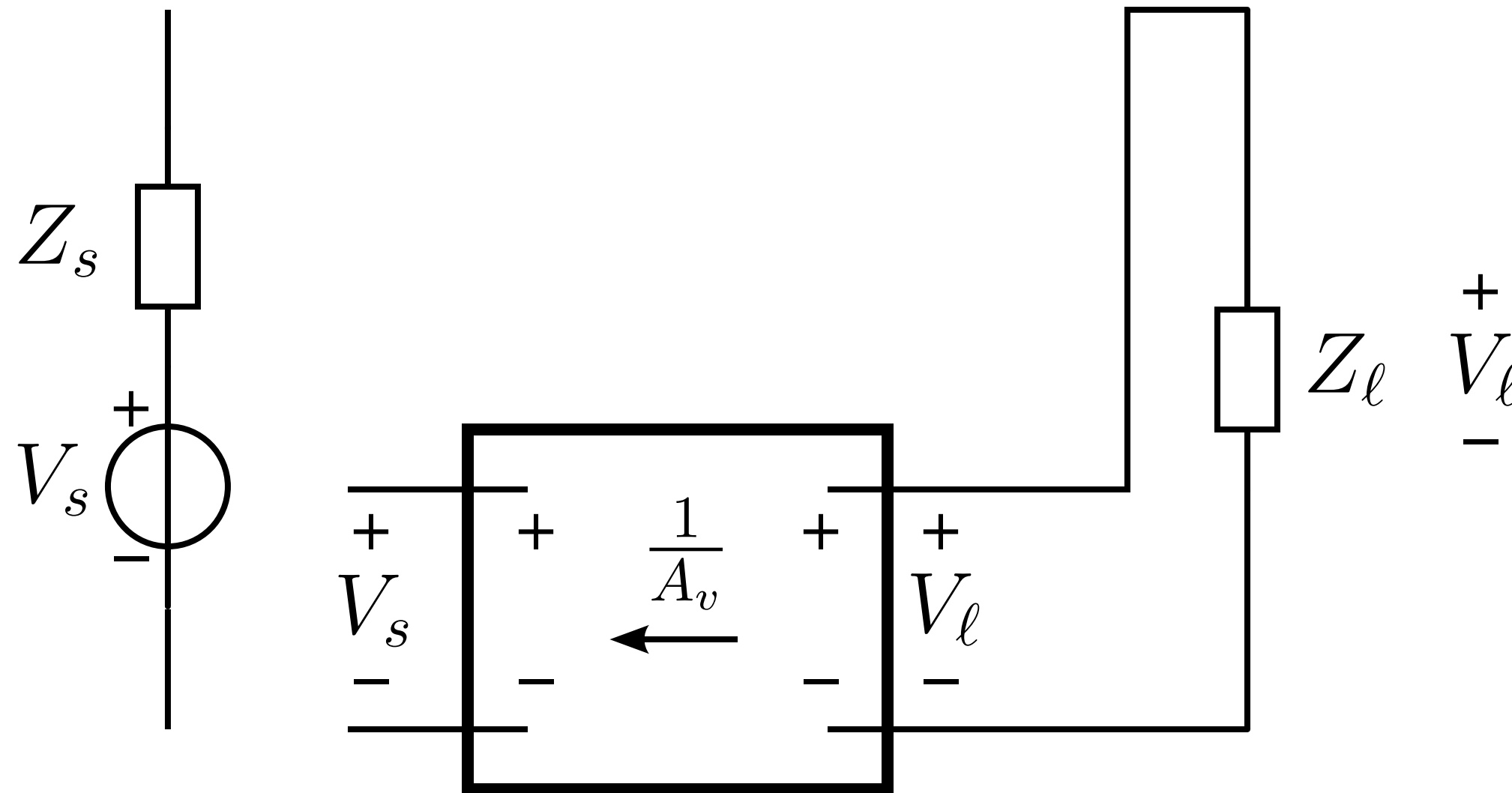
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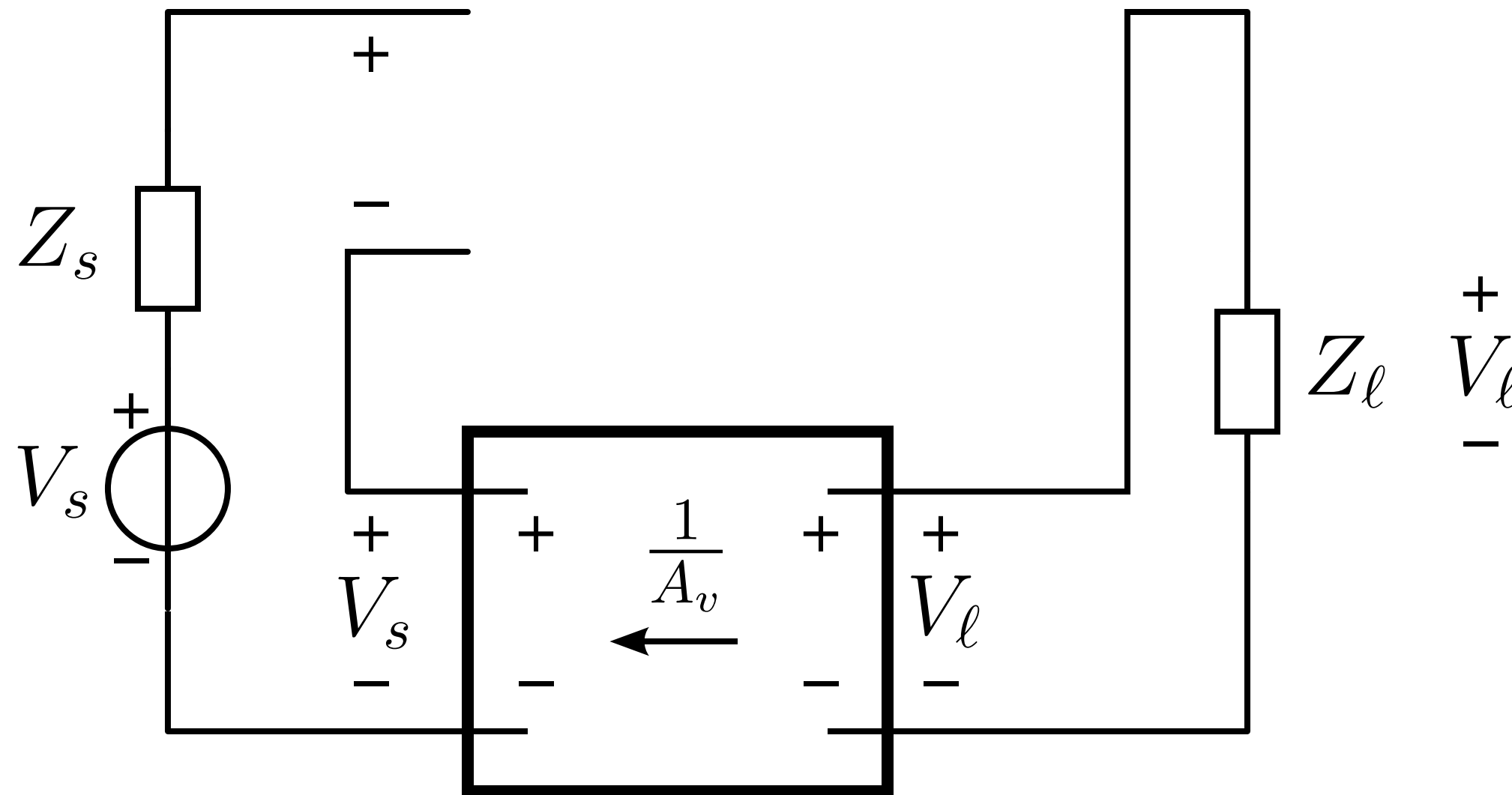
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4. Nullify the difference

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4. Nullify the difference
 - a. In case of a voltage source signal, a nullator closes the loop of the above anti-series connection

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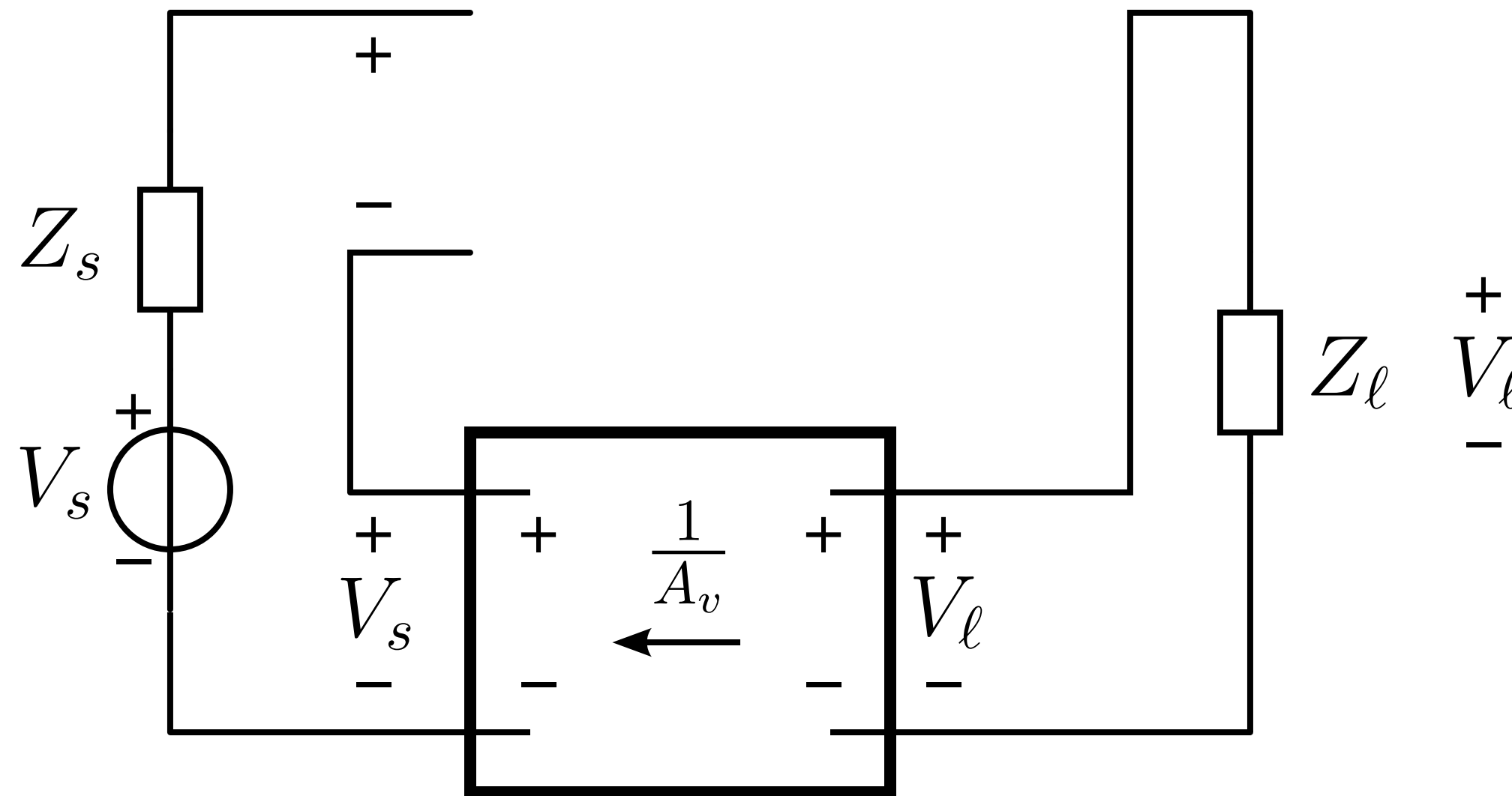
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4. Nullify the difference
 - a. In case of a voltage source signal, a nullator closes the loop of the above anti-series connection
 - b. In case of a current source signal, a nullator is placed in parallel with the above anti-parallel connection

Negative Feedback Voltage Amplifier

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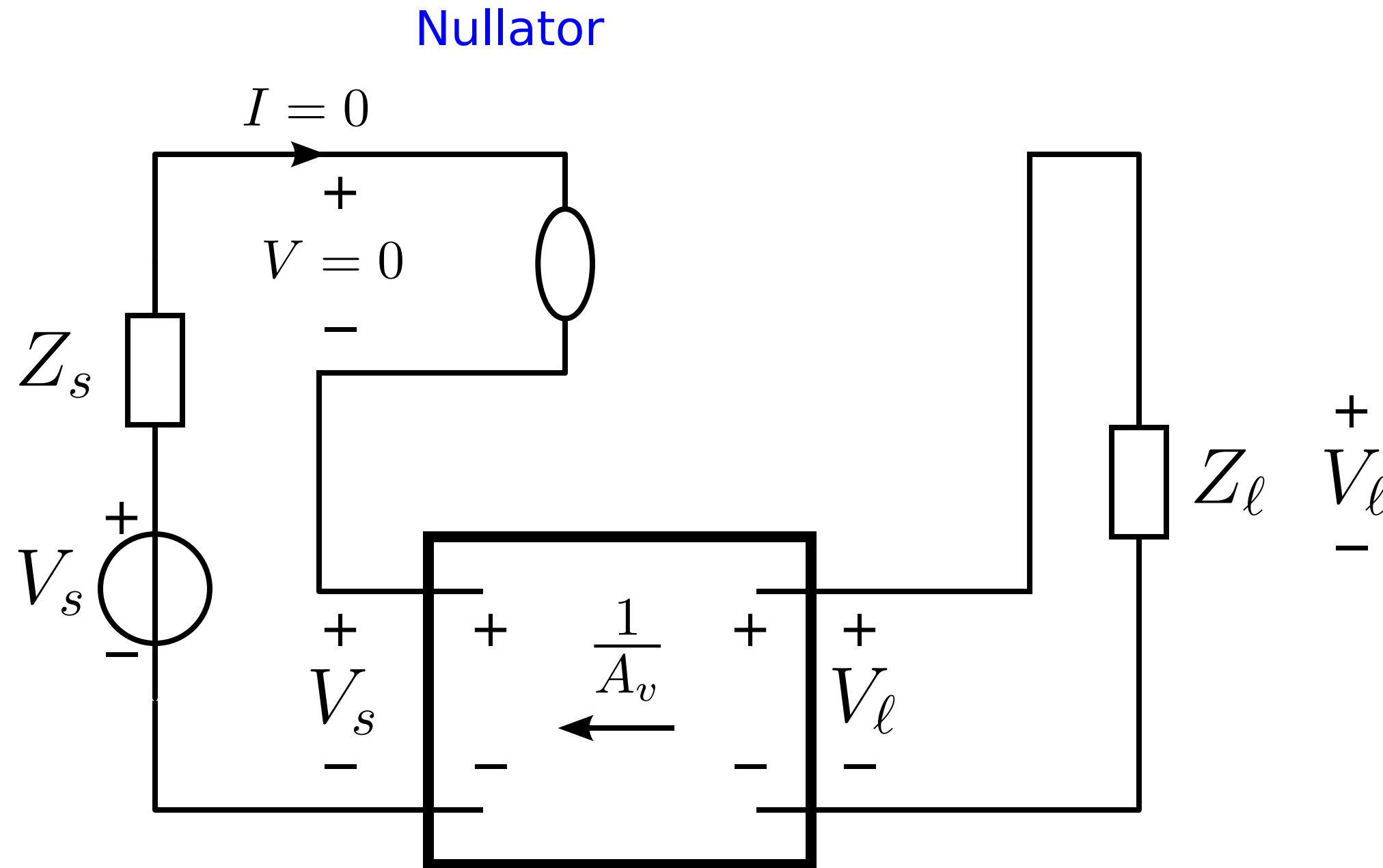
$$\frac{V_\ell}{V_s} = A_v$$



1. Measure the voltage across the load
2. Generate a copy of the source voltage from V_ℓ
3. Subtract the copy from the source voltage

4. Nullify the difference

Negative Feedback Voltage Amplifier



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We would like to establish a transfer:

$$\frac{V_\ell}{V_s} = A_v$$

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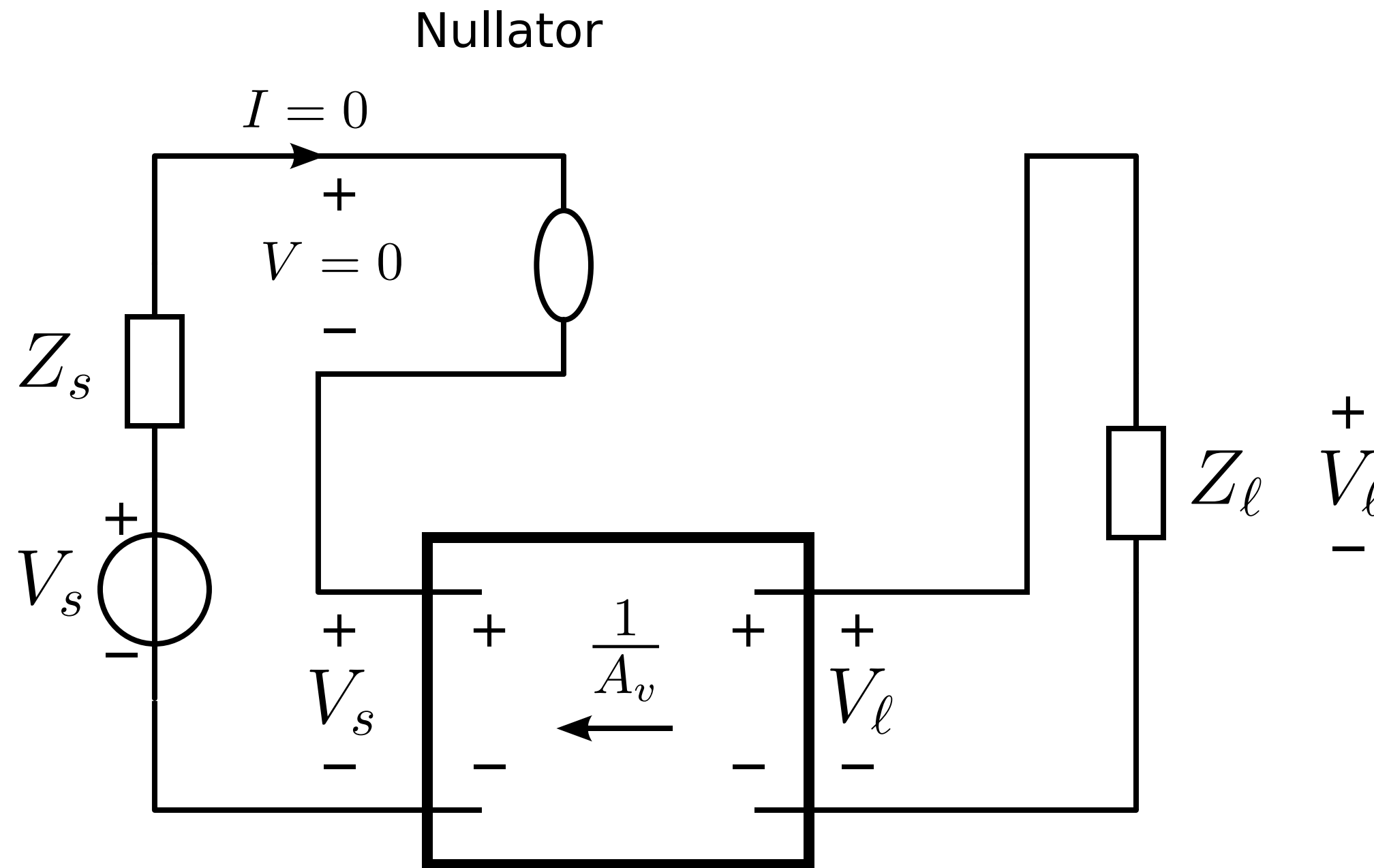
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4. Nullify the difference
 - a. In case of a voltage source signal, a nullator closes the loop of the above anti-series connection
 - b. In case of a current source signal, a nullator is placed in parallel with the above anti-parallel connection
 - c. In case of a voltage load signal, a norator is placed in parallel with the load

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 - b. In case of a current source signal, a nullator is placed in parallel with the above anti-parallel connection
 - c. In case of a voltage load signal, a norator is placed in parallel with the load
 - d. In case of a current load signal, a norator closes the loop of the series connection of the load and the input of the feedback network

Negative Feedback Voltage Amplifier



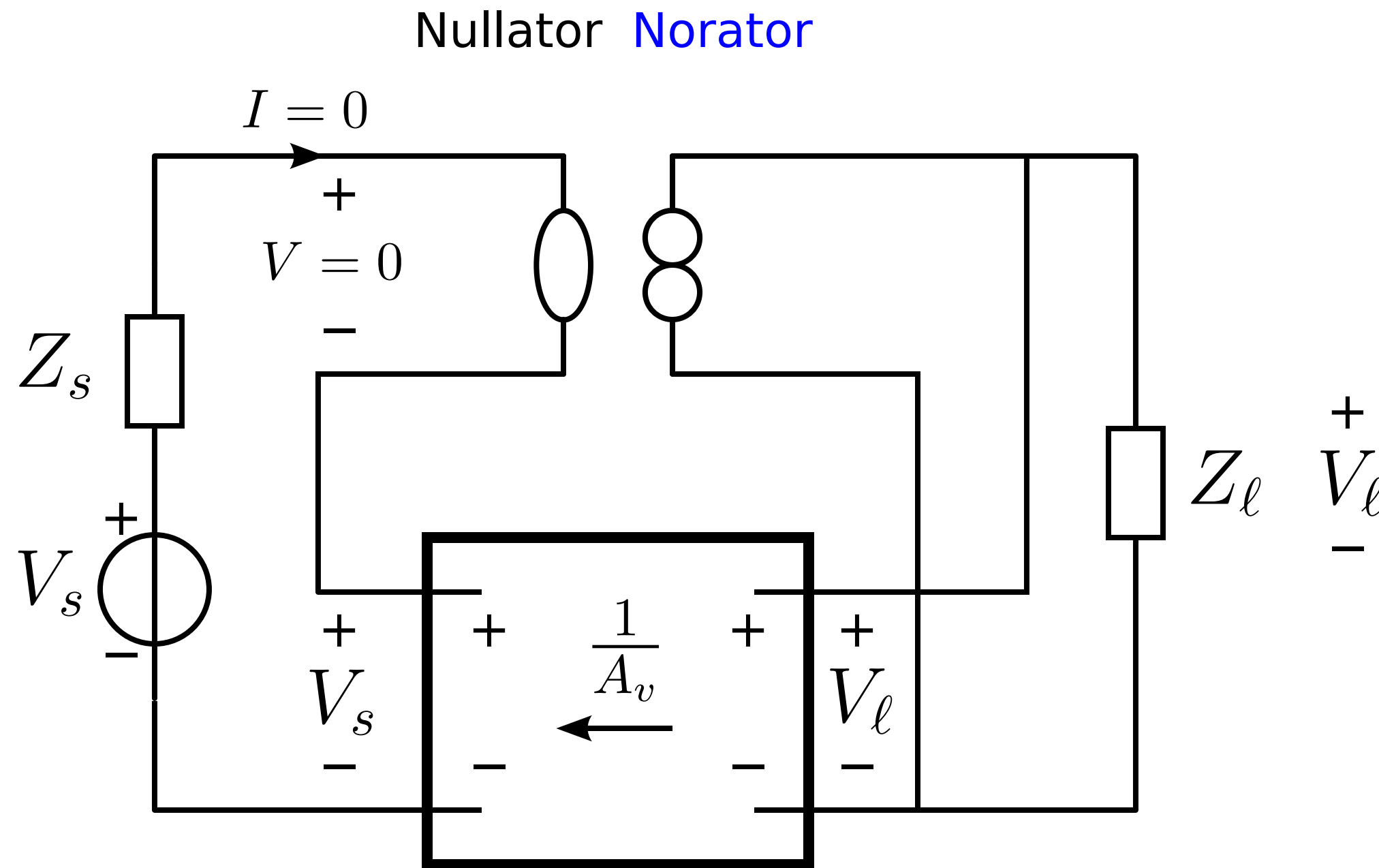
Starting point

We would like to establish a transfer:

$$\frac{V_l}{V_s} = A_v$$

1. Measure the voltage across the load
2. Generate a copy of the source voltage from V_l
3. Subtract the copy from the source voltage
4. Nullify the difference

Negative Feedback Voltage Amplifier



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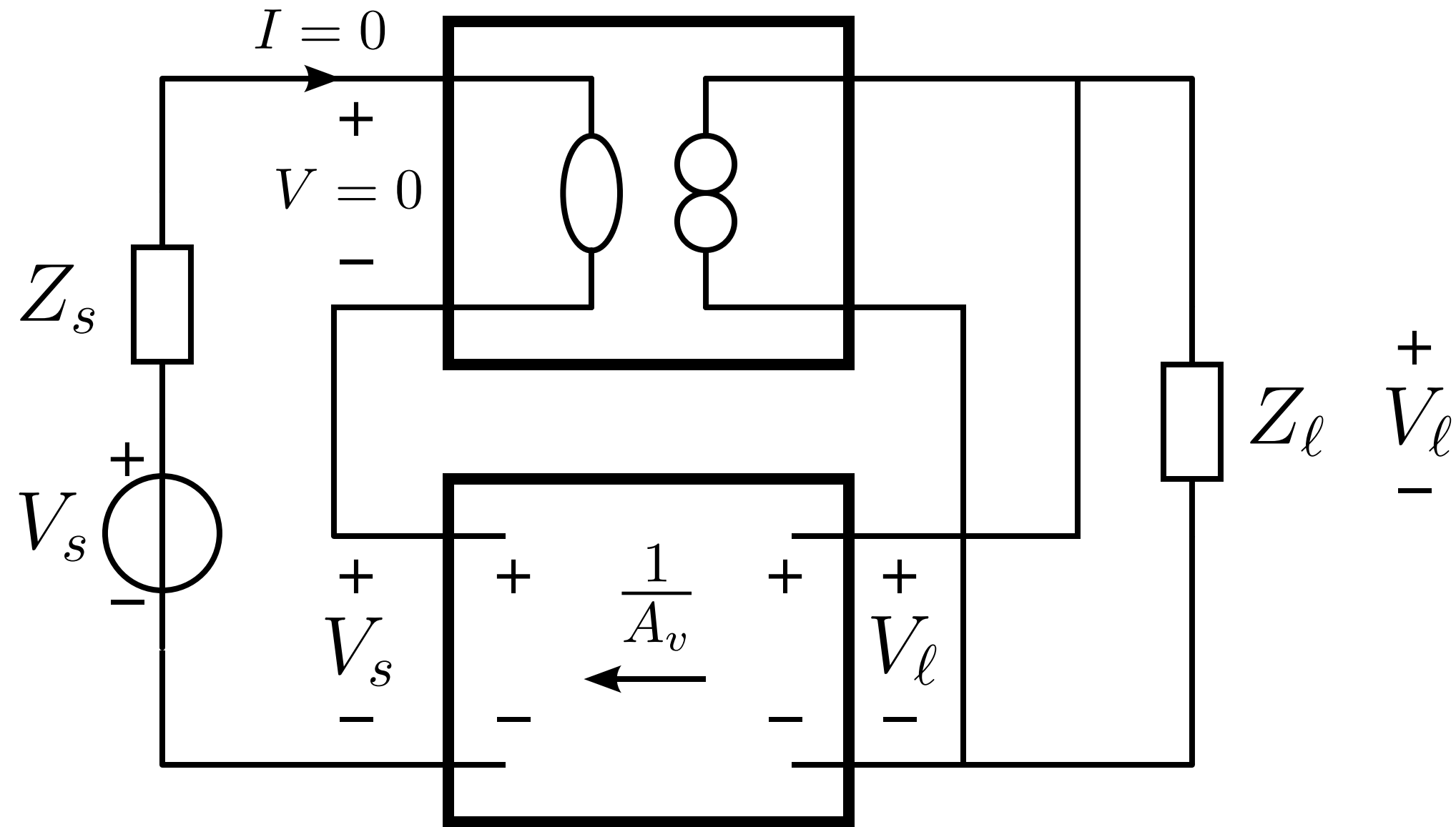
$$\frac{V_\ell}{V_s} = A_v$$

1. Measure the voltage across the load
2. Generate a copy of the source voltage from V_ℓ
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Nullor is ideal controller

Nullator Norator



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