

Structured Electronic Design

Design of the Bandwidth of Negative Feedback Amplifiers

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Bandwidth definition

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Source-to-load
transfer

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Asymptotic gain
equals ideal gain
(proper IgRef selection)

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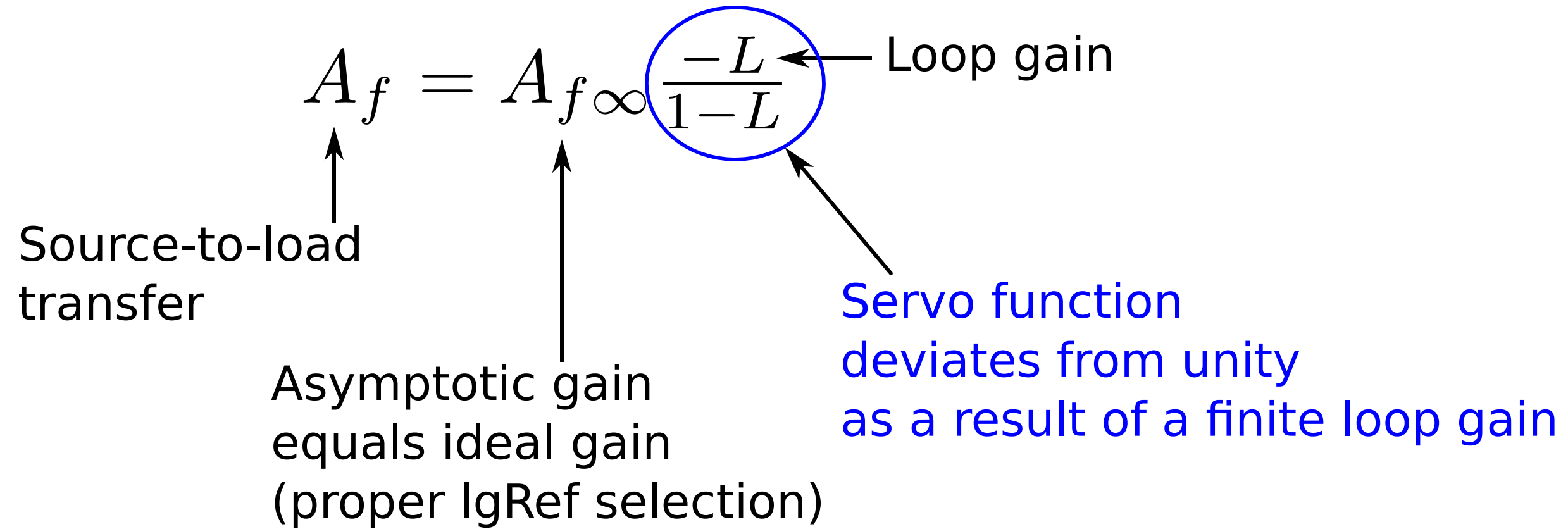
Source-to-load transfer

Asymptotic gain equals ideal gain (proper IgRef selection)

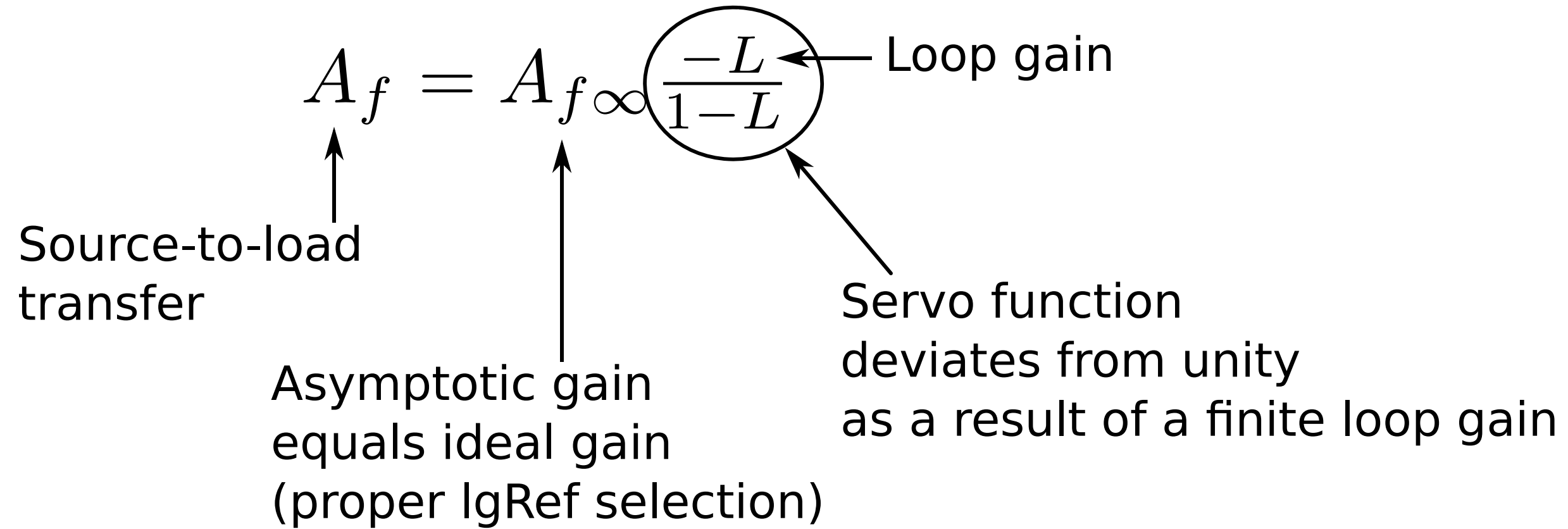
← Loop gain

The diagram illustrates the bandwidth definition equation $A_f = A_{f\infty} \frac{-L}{1-L}$. It includes three annotations: 'Source-to-load transfer' with an arrow pointing to A_f , 'Asymptotic gain equals ideal gain (proper IgRef selection)' with an arrow pointing to $A_{f\infty}$, and 'Loop gain' in blue with an arrow pointing to $-L$ in the numerator.

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1. Desired filter characteristic designed with the ideal gain

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Loop gain

Servo function deviates from unity as a result of a finite loop gain

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2. Bandwidth definition decoupled from desired filter characteristic

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3. Bandwidth will be defined as difference between low-pass -3dB and high-pass -3dB frequencies of servo function

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The diagram shows the equation $A_f = A_{f\infty} \left(\frac{-L}{1-L} \right)$. An arrow points from the text 'Source-to-load transfer' to the A_f term. Another arrow points from 'Asymptotic gain equals ideal gain (proper IgRef selection)' to the $A_{f\infty}$ term. A third arrow points from 'Loop gain' to the $-L$ in the numerator of the fraction. A fourth arrow points from 'Servo function deviates from unity as a result of a finite loop gain' to the entire fraction $\frac{-L}{1-L}$, which is circled in the original image.

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