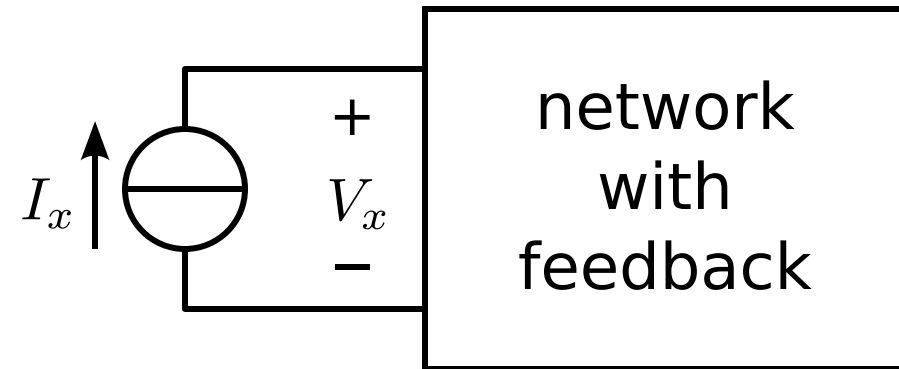


# Structured Electronic Design

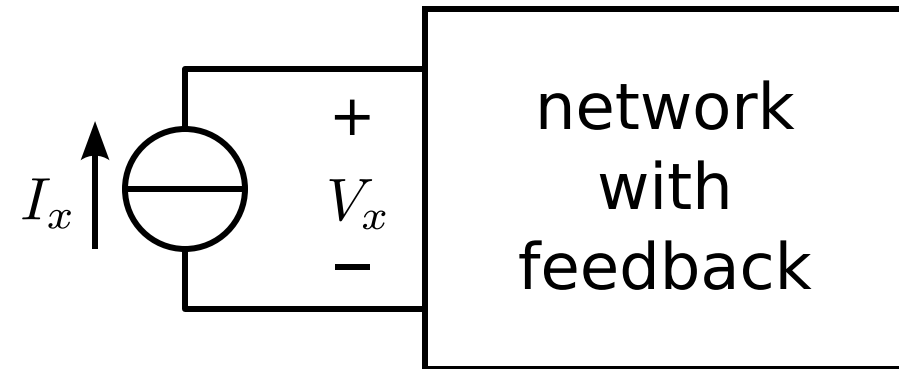
## Port impedance of single-loop feedback amplifiers

# Port impedance and the asymptotic-gain model

# Port impedance and the asymptotic-gain model

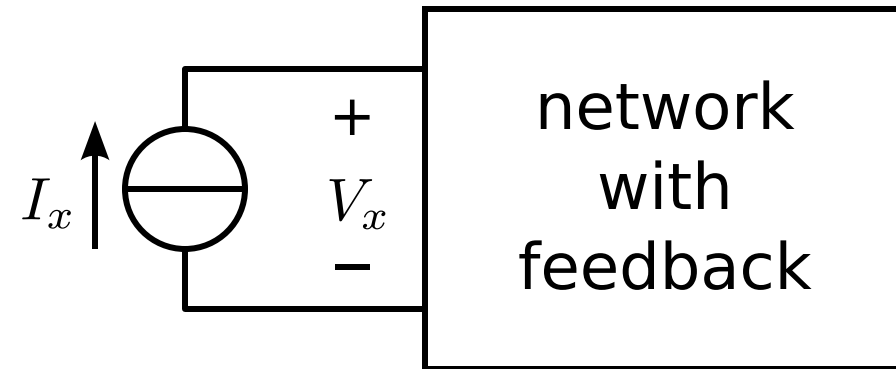


# Port impedance and the asymptotic-gain model



Impedance port x  $Z_{xf} = \frac{V_x}{I_x}$

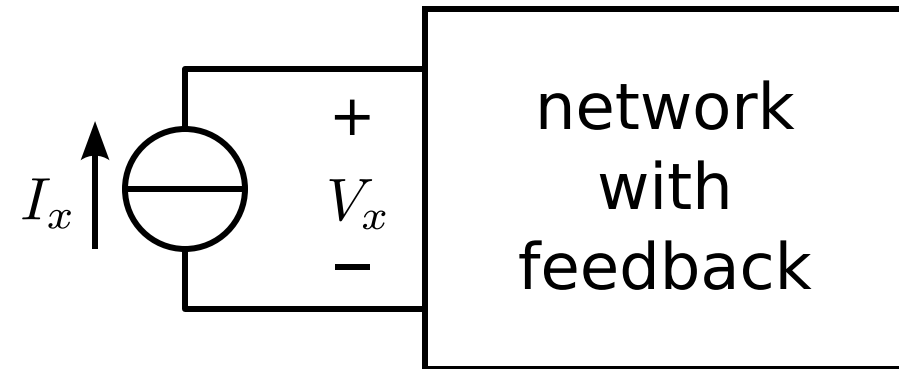
# Port impedance and the asymptotic-gain model



$$Z_{xf} = \rho \frac{1-L_{sc}}{1-L_o}$$

Impedance port x  $Z_{xf} = \frac{V_x}{I_x}$

# Port impedance and the asymptotic-gain model

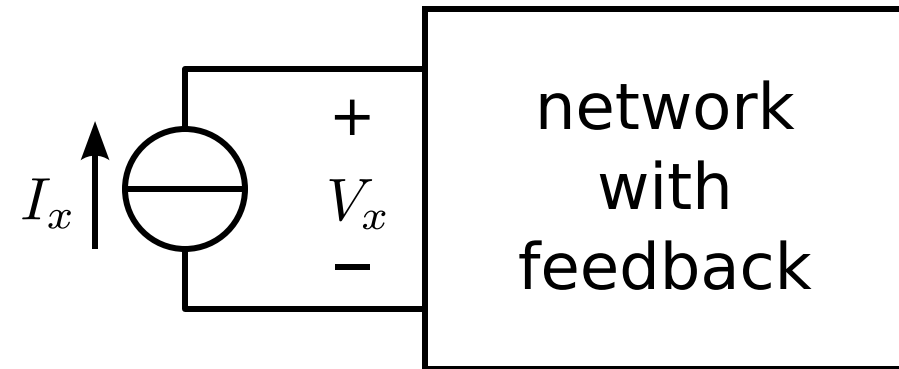


$$Z_{xf} = \rho \frac{1-L_{sc}}{1-L_o}$$

$\rho$  Port impedance with gain of loop gain reference set to zero

Impedance port x  $Z_{xf} = \frac{V_x}{I_x}$

# Port impedance and the asymptotic-gain model



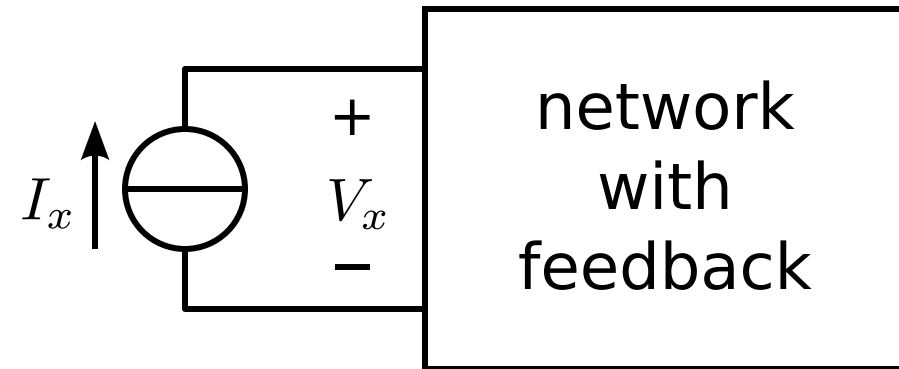
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$L_{sc}$  Loop gain with port x shorted

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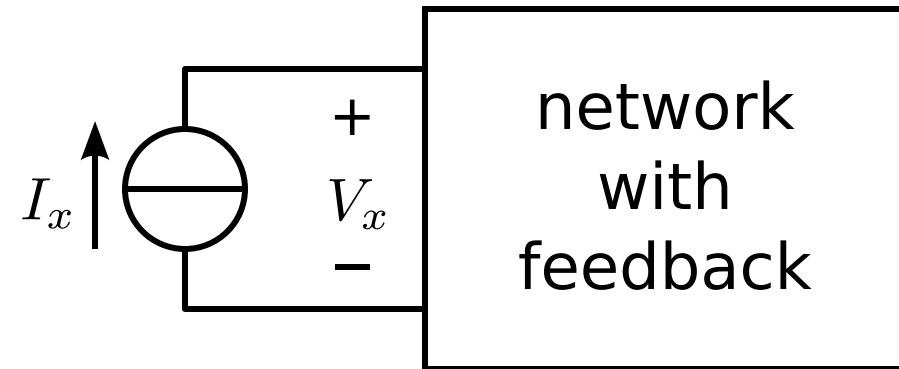
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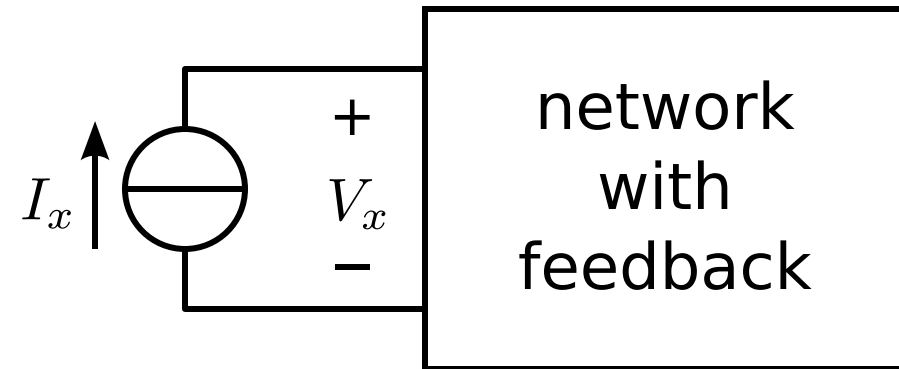
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## Single-loop feedback amplifiers

# Port impedance and the asymptotic-gain model



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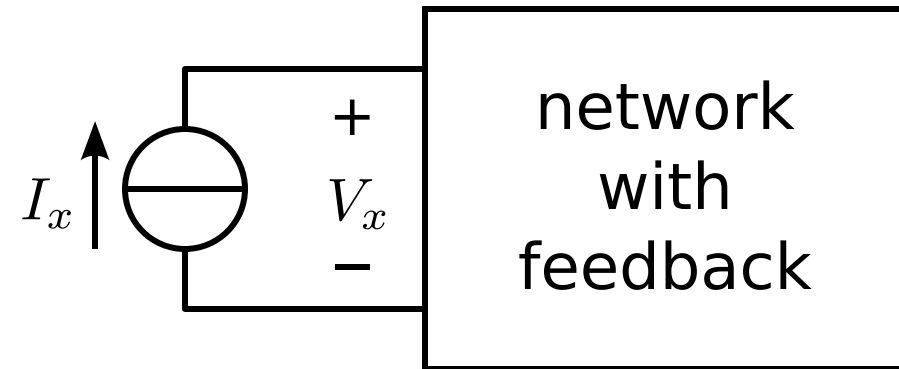
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## Single-loop feedback amplifiers

Parallel feedback at a port:

# Port impedance and the asymptotic-gain model



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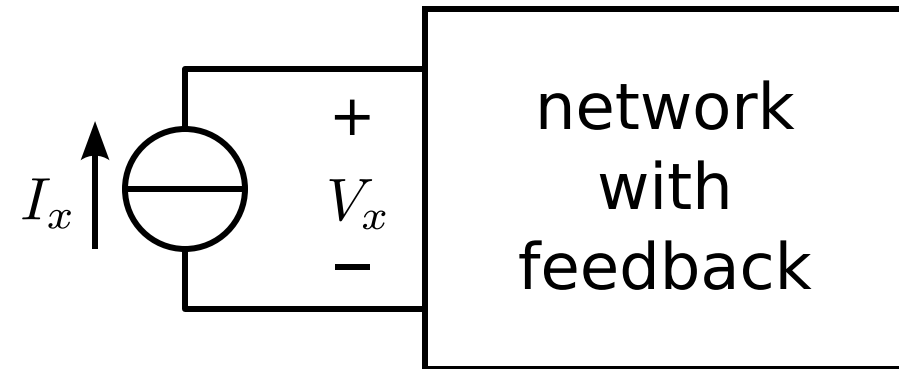
$L_{sc}$  Loop gain with port x shorted

$L_o$  Loop gain with port x open

## Single-loop feedback amplifiers

Parallel feedback at a port:  $L_{sc} = 0$

# Port impedance and the asymptotic-gain model



Impedance port x  $Z_{xf} = \frac{V_x}{I_x}$

$$Z_{xf} = \rho \frac{1-L_{sc}}{1-L_o}$$

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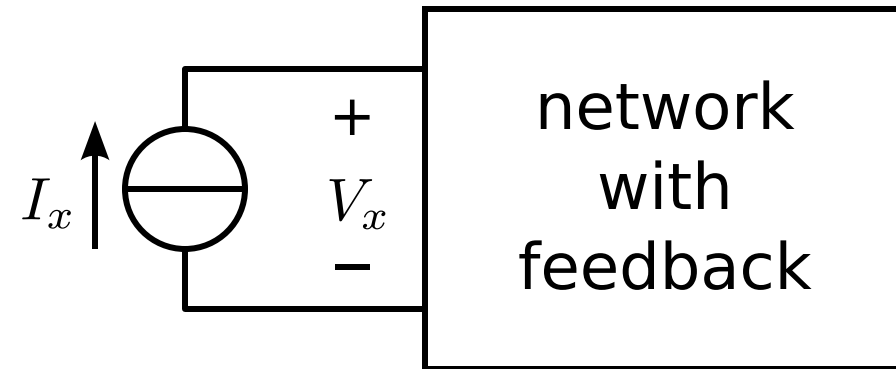
$L_o$  Loop gain with port x open

## Single-loop feedback amplifiers

Parallel feedback at a port:  $L_{sc} = 0$

Asymptotic-value of port impedance equals zero

# Port impedance and the asymptotic-gain model



Impedance port x  $Z_{xf} = \frac{V_x}{I_x}$

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$L_{sc}$  Loop gain with port x shorted

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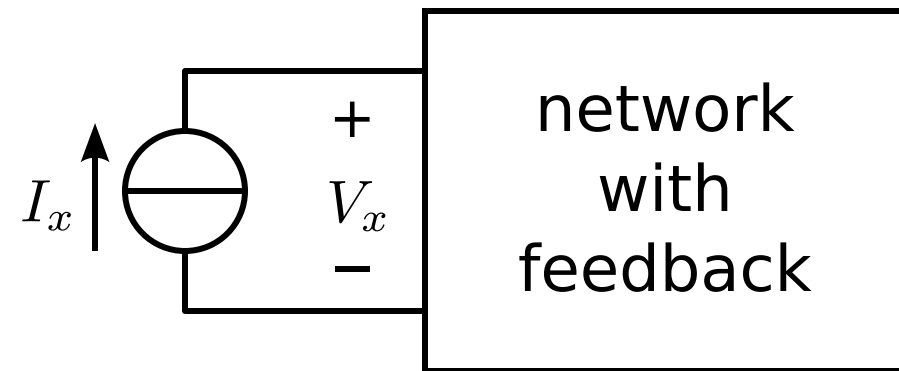
## Single-loop feedback amplifiers

Parallel feedback at a port:  $L_{sc} = 0$

Asymptotic-value of port impedance equals zero

Series feedback at a port:

# Port impedance and the asymptotic-gain model



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$L_{sc}$  Loop gain with port x shorted

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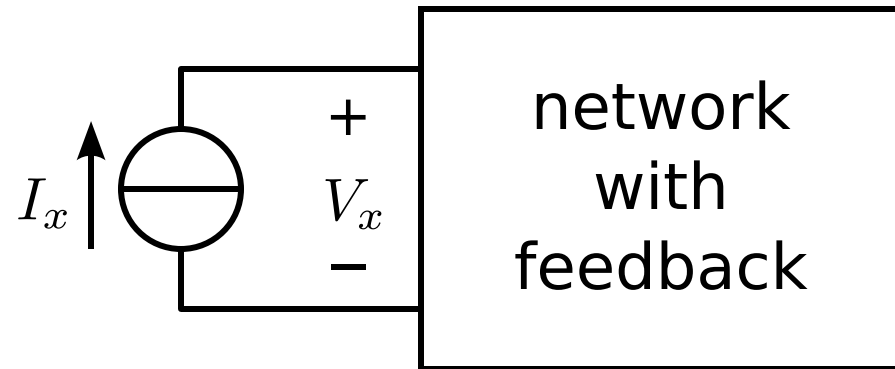
## Single-loop feedback amplifiers

Parallel feedback at a port:  $L_{sc} = 0$

Asymptotic-value of port impedance equals zero

Series feedback at a port:  $L_o = 0$

# Port impedance and the asymptotic-gain model



Impedance port x  $Z_{xf} = \frac{V_x}{I_x}$

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## Single-loop feedback amplifiers

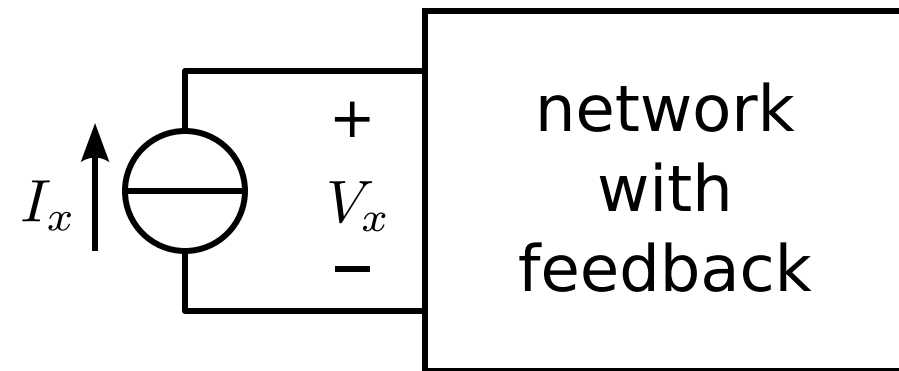
Parallel feedback at a port:  $L_{sc} = 0$

Asymptotic-value of port impedance equals zero

Series feedback at a port:  $L_o = 0$

Asymptotic-value of port impedance equals infinity

# Port impedance and the asymptotic-gain model



Impedance port x  $Z_{xf} = \frac{V_x}{I_x}$

$$Z_{xf} = \rho \frac{1-L_{sc}}{1-L_o}$$

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## Single-loop feedback amplifiers

Parallel feedback at a port:  $L_{sc} = 0$

Asymptotic-value of port impedance equals zero

Series feedback at a port:  $L_o = 0$

Asymptotic-value of port impedance equals infinity