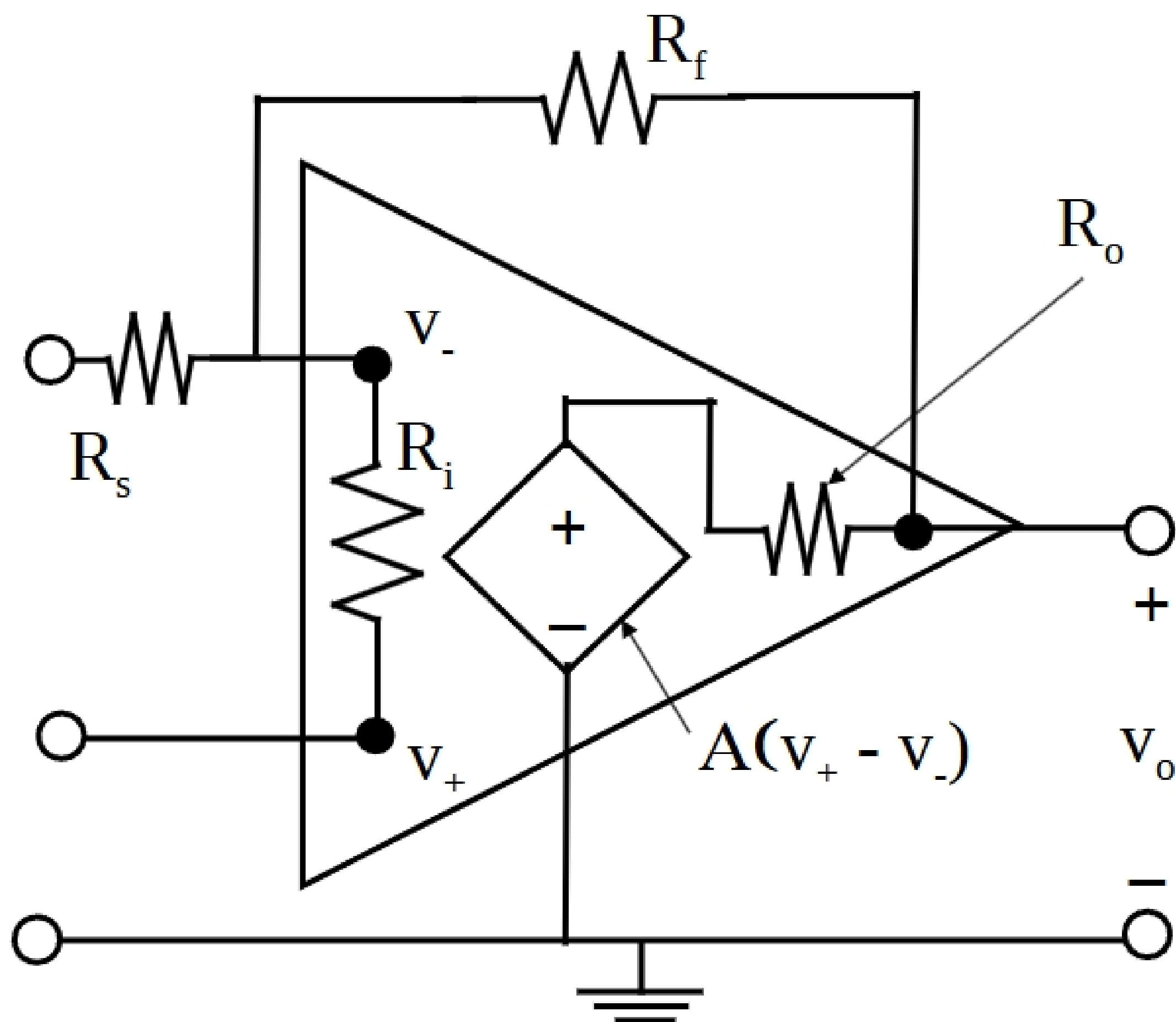


Op Amp Basics—Ideal Op Amps

Revisit Op Amp with negative feedback



Features:

$(v_+ - v_-)$ is small;

A is large ($\approx 10^4$)

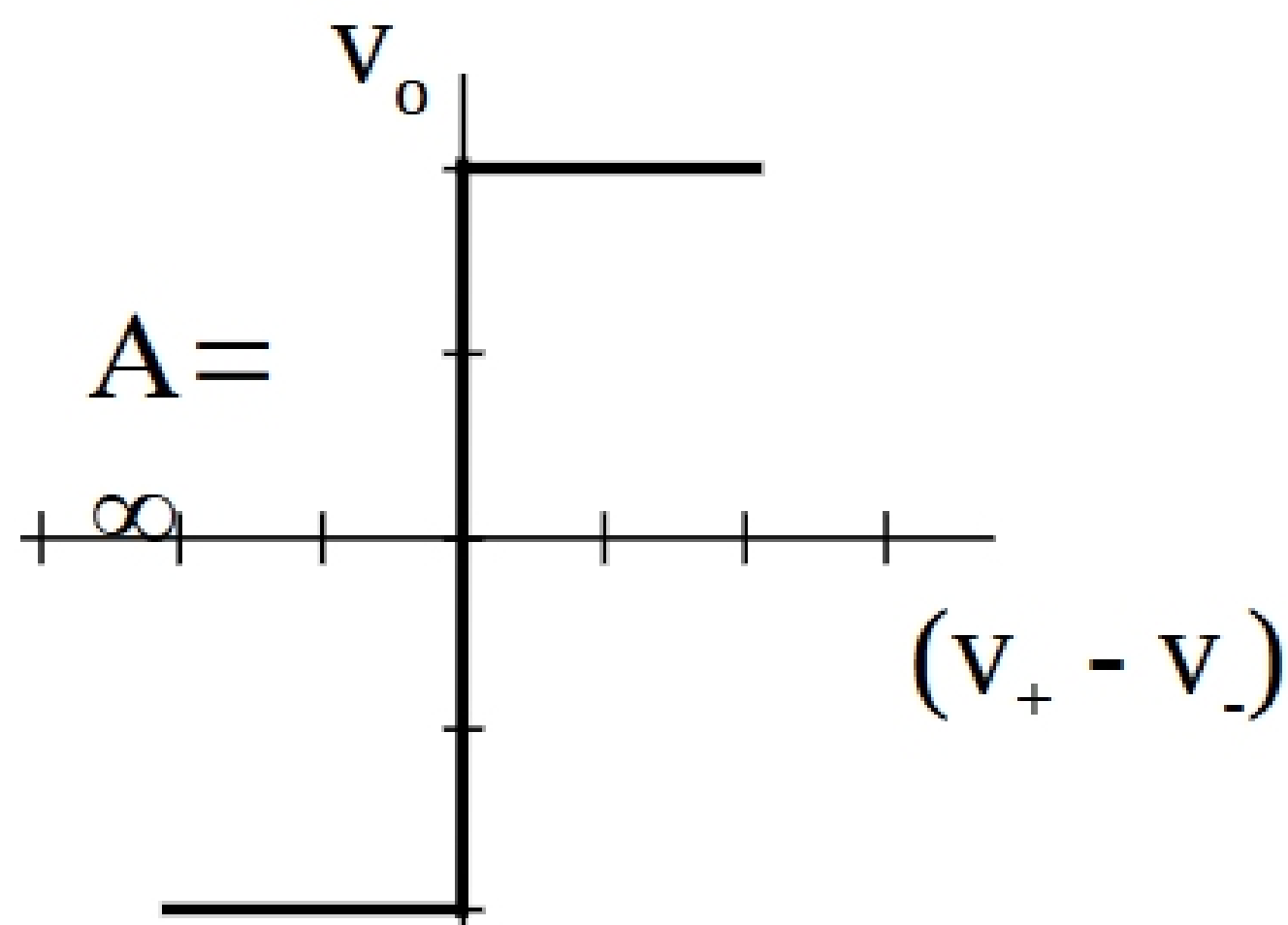
R_o is as small as possible

Voltage input (not current)

Consider modifications to simplify analysis

$$\mathbf{v_+ = v_-}$$

Implication of this assumption: voltage transfer characteristic is modified as shown below,



Voltage gain becomes infinite

Virtual short conditions: $\mathbf{v_+ = v_-}$
 $\mathbf{A = \infty}$

Output resistance

$$\mathbf{R_o = 0 \Omega}$$

Implication of this assumption: no voltage drop after dependent source (ideal output behavior)

Voltage input (minimal currents into op amp)

$$\mathbf{R_i = \infty}$$

Implication of this assumption:

$$\mathbf{i_+ = i_- = 0}$$

Performing KCL on op amp (see p. 3, lect. 26)

$$\mathbf{i_+ + i_- + i_o + i_{c+} + i_{c-} = 0}$$

Using above reduces this to,

$$\mathbf{i_o = -(i_{c+} + i_{c-})}$$