فصل ۱۲- فیدبک (قسمت سوم- از کتاب صدرا)

CHAPTER 8

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General structure of the feedback amplifier

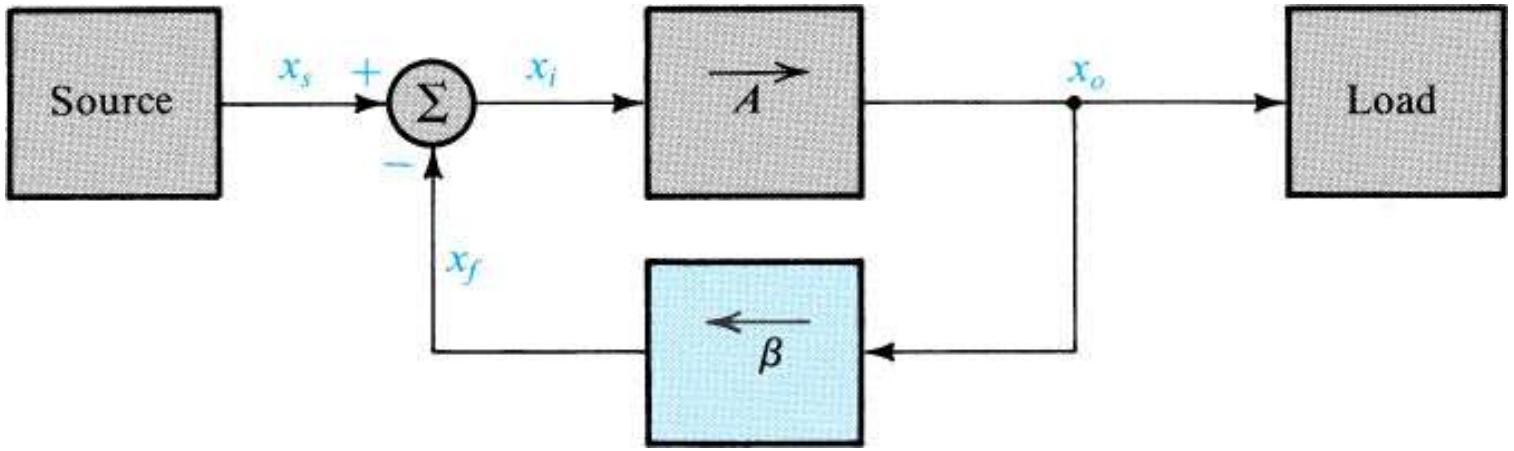
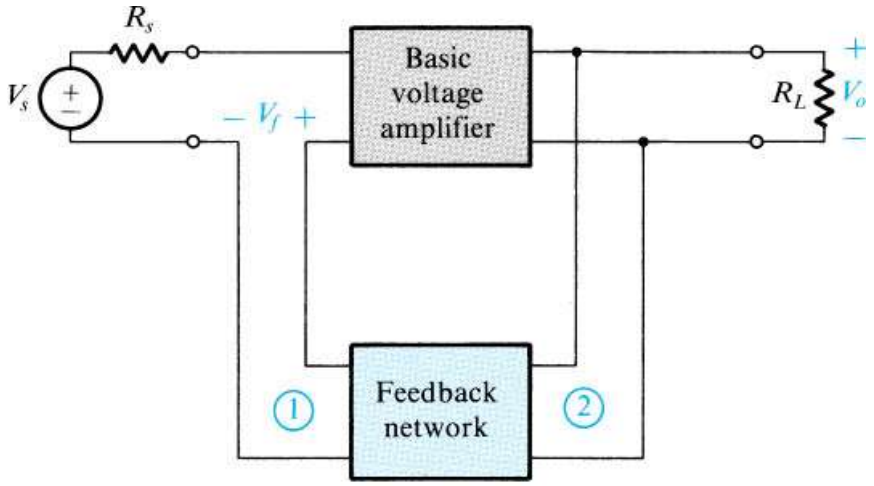
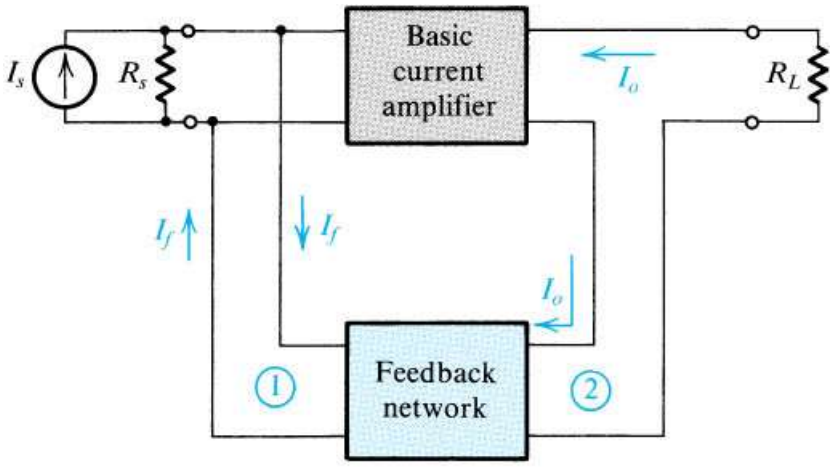


Figure 8.1 This is a signal-flow diagram, and the quantities x represent either voltage or current signals.

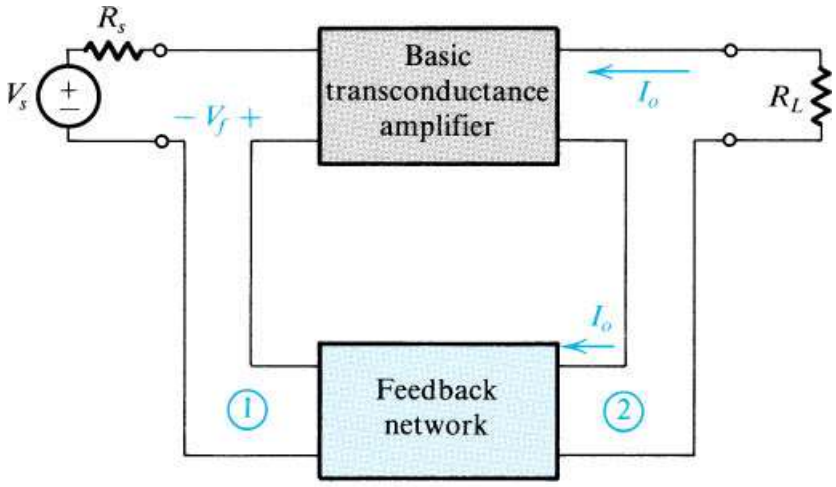


(a)

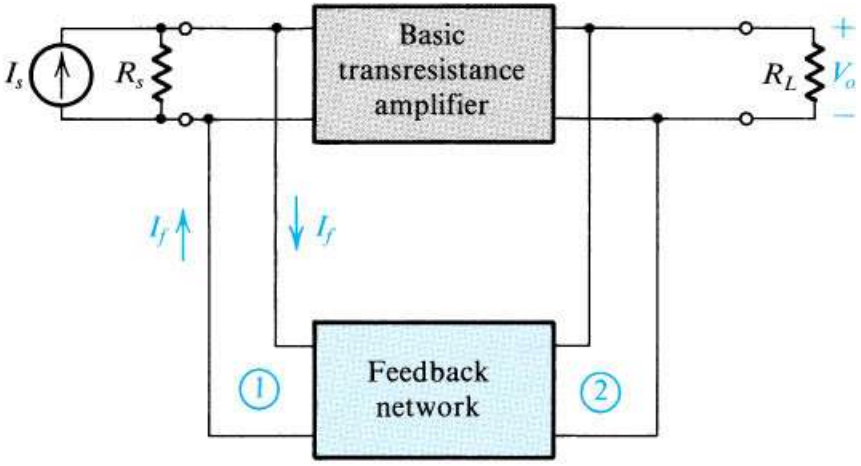


(b)

The four basic feedback topologies



(c)



(d)

(a) voltage-mixing voltage-sampling (series–shunt) topology; **(b)** current-mixing current-sampling (shunt–series) topology; **(c)** voltage-mixing current-sampling (series–series) topology; **(d)** current-mixing voltage-sampling (shunt–shunt) topology.

Figure 8.5 shunt–series feedback (Biasing not shown)

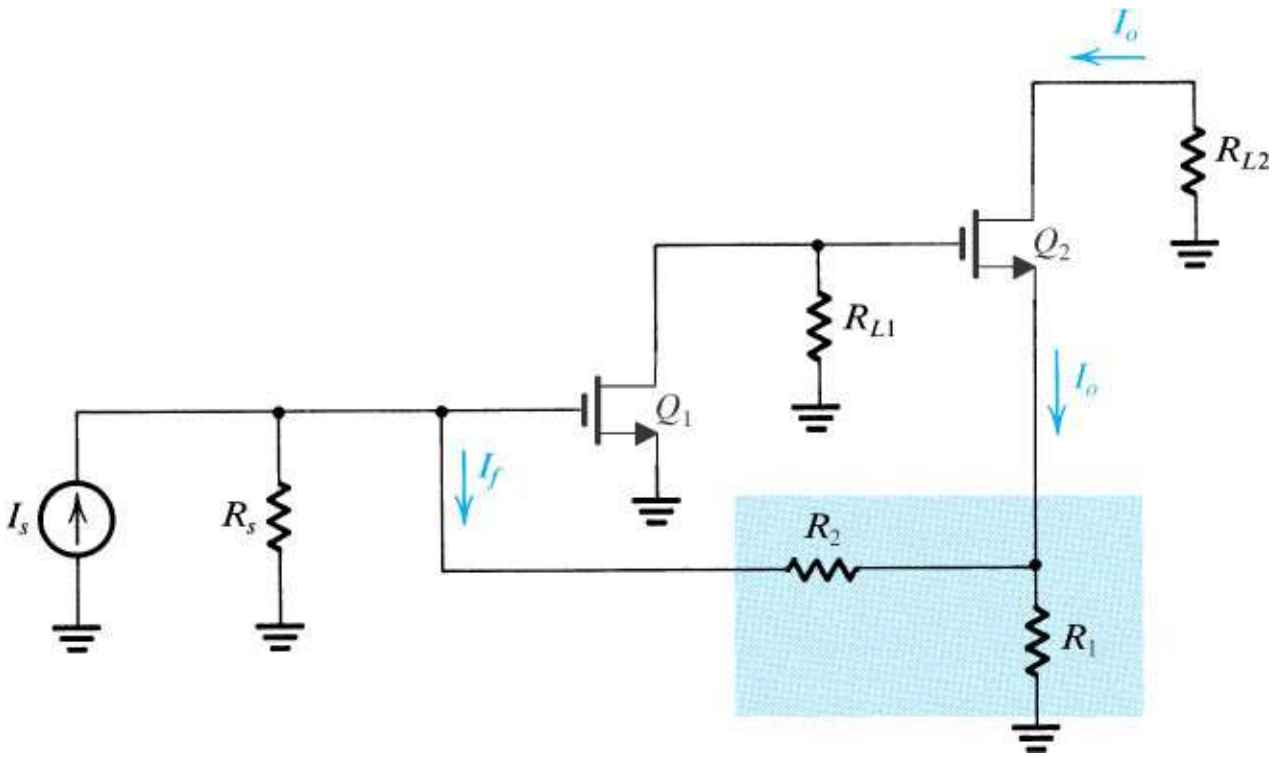
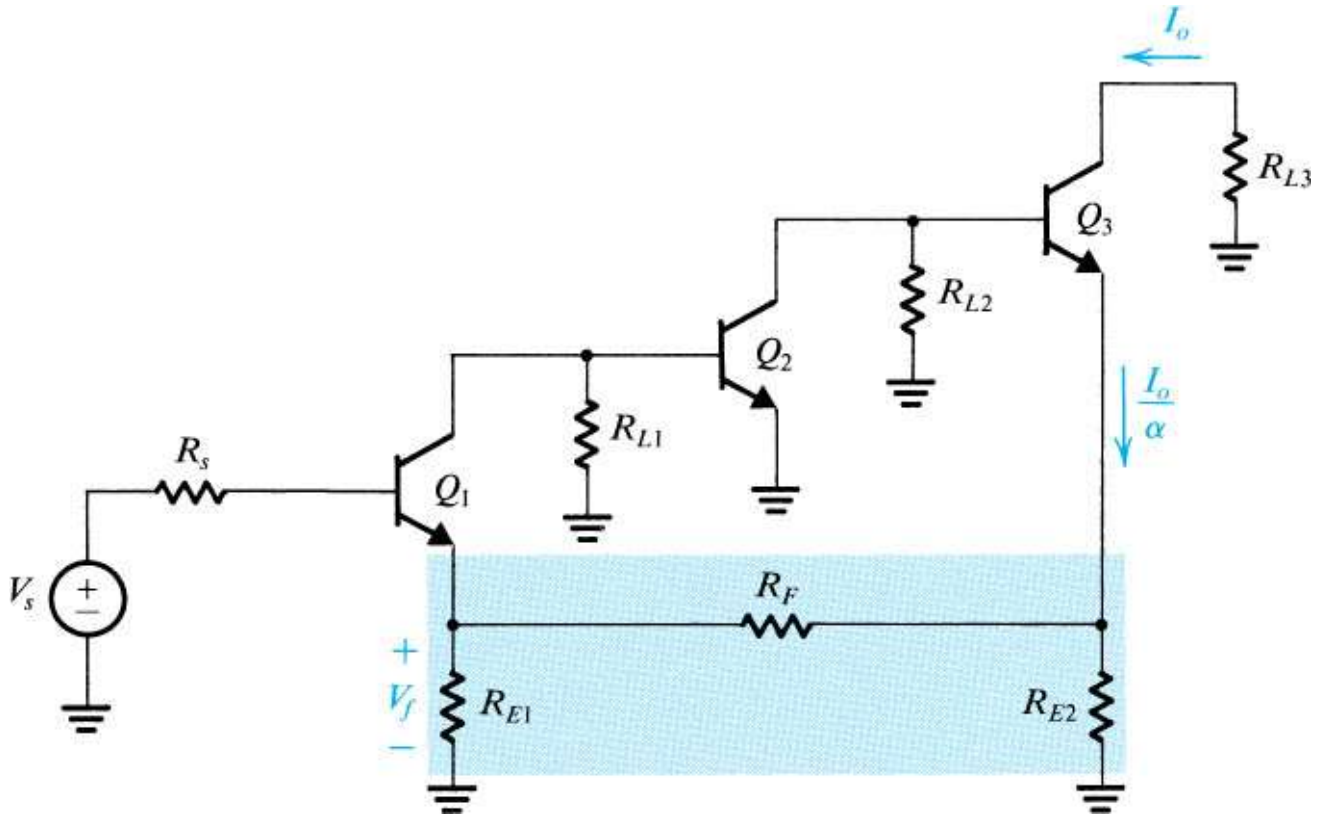


Figure 8.6 series–series feedback topology (Biasing not shown.)



(a) The inverting op-amp configuration redrawn as

(b) an example of shunt–shunt feedback.

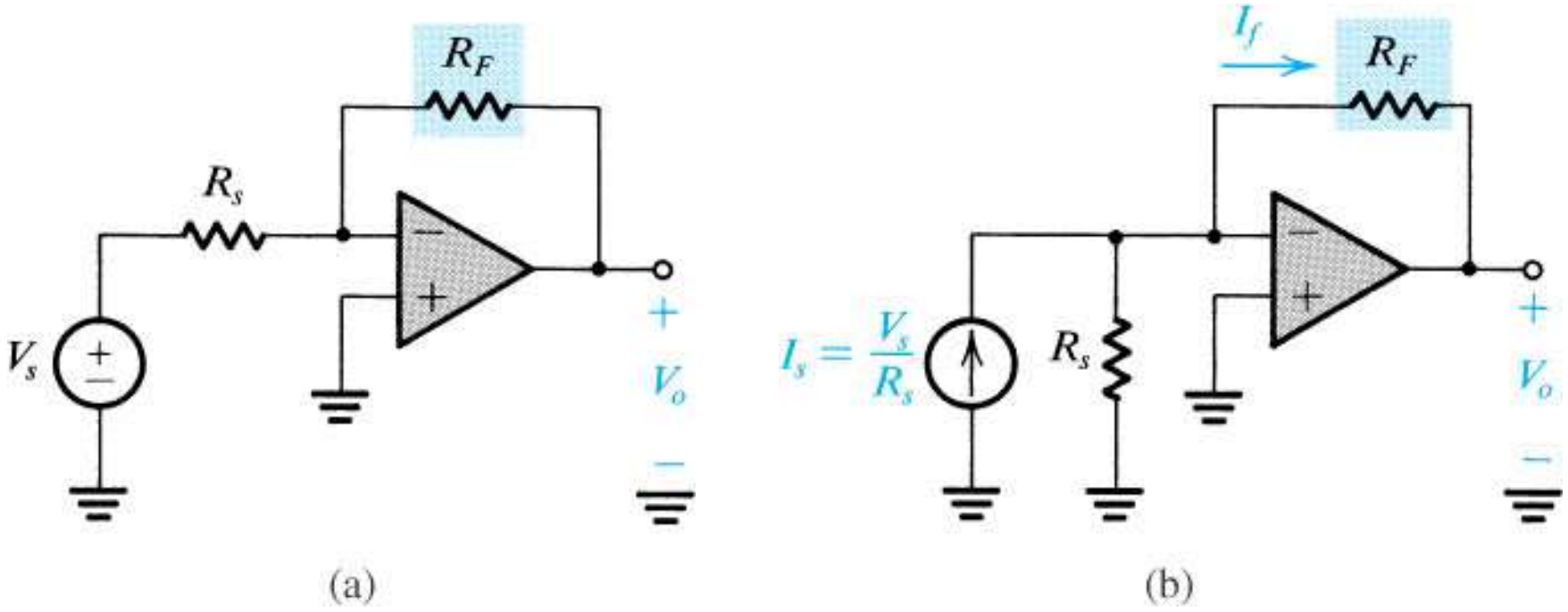
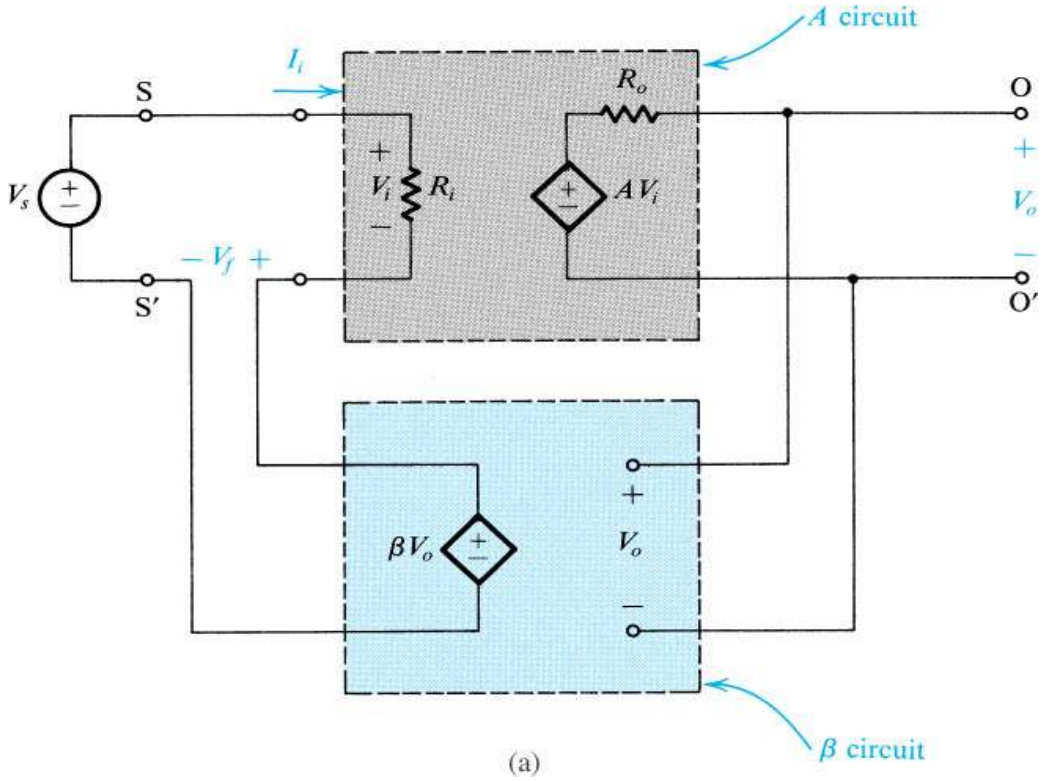
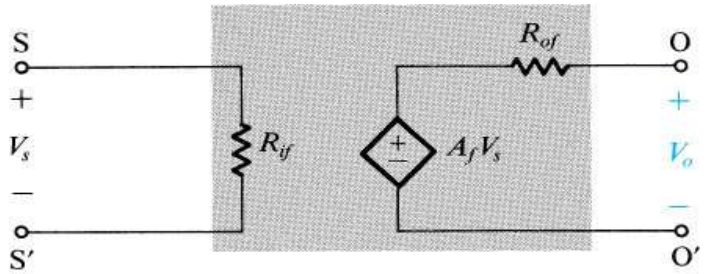


Figure 8.8 The series–shunt feedback amplifier: **(a)** ideal structure and **(b)** equivalent circuit.



(a)



(b)

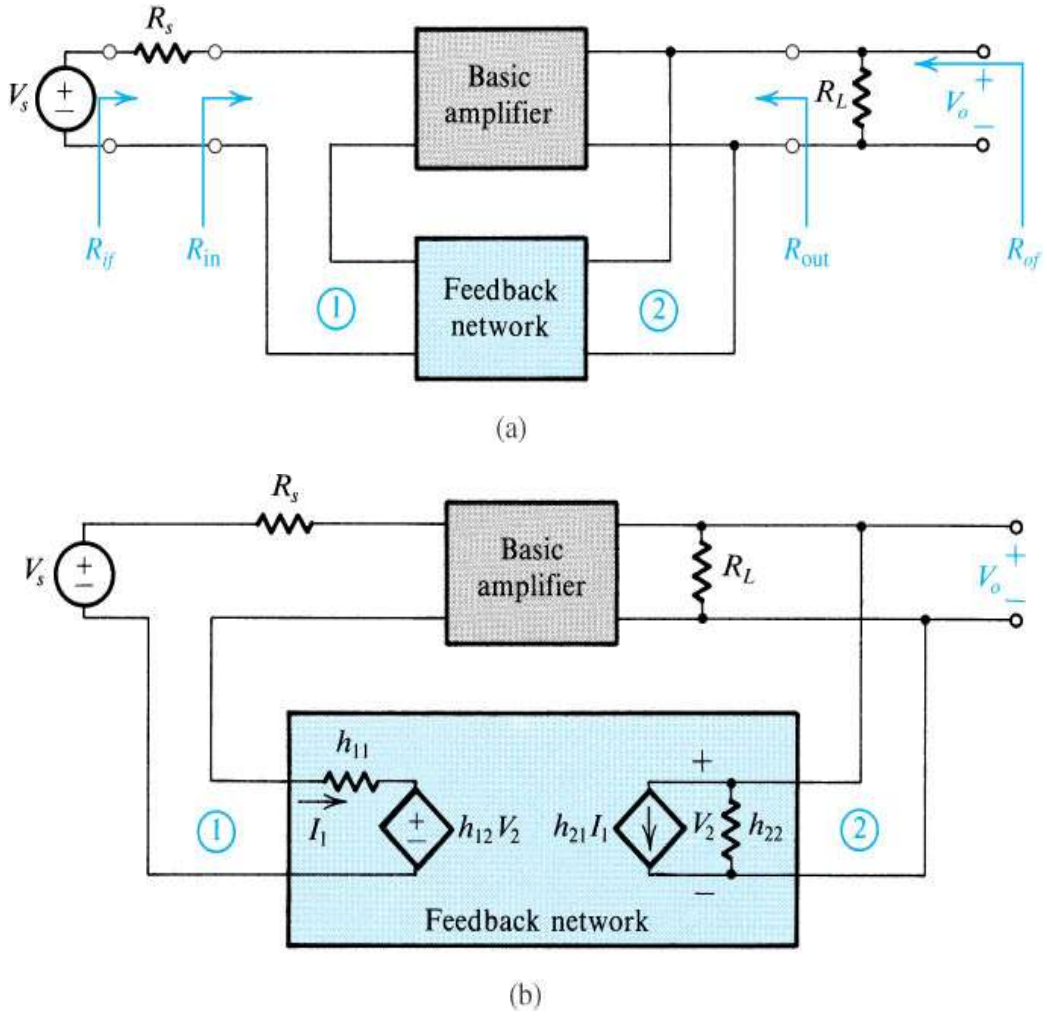


Figure 8.10 (a) Block diagram of a practical **series–shunt** feedback amplifier. **(b)** The circuit in (a) with the feedback network represented by its ***h* parameters**.

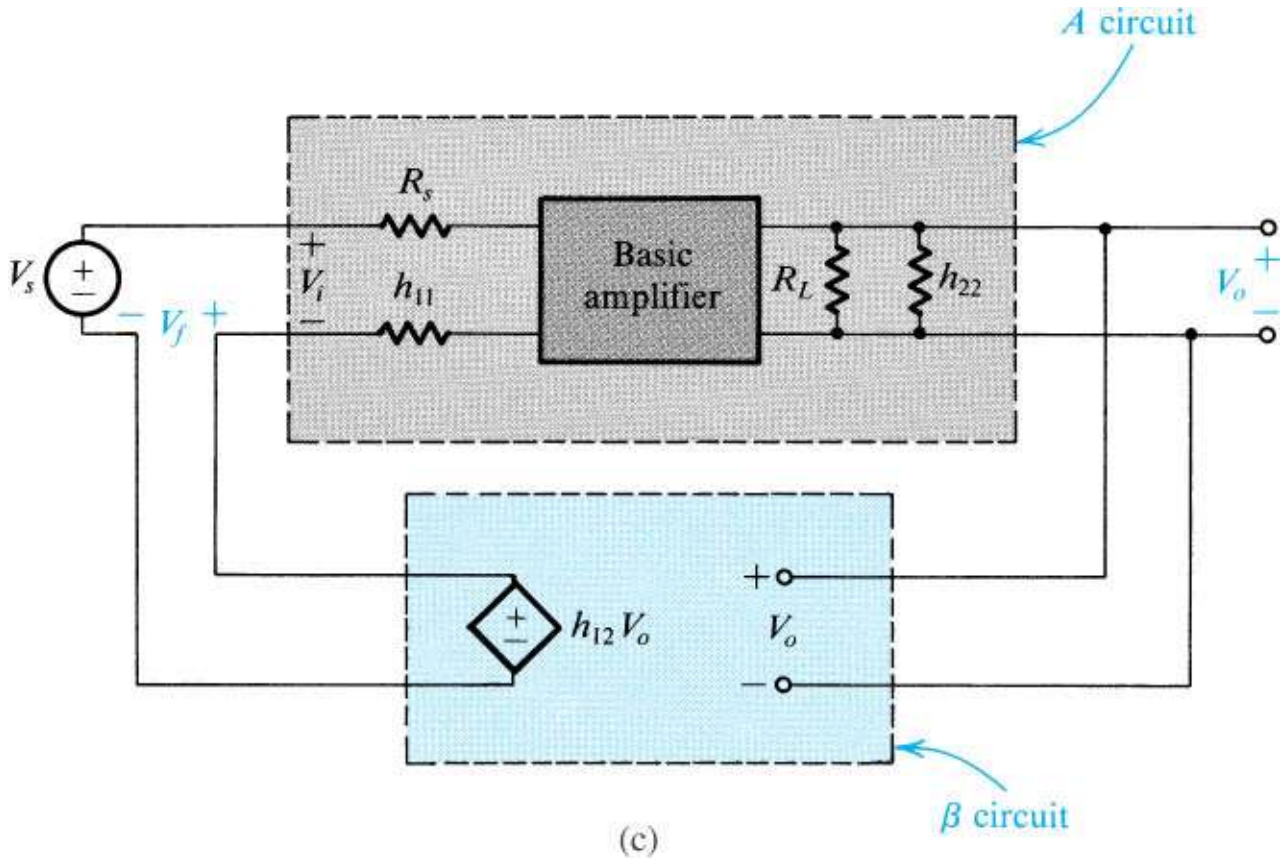


Figure 8.10 *(Continued)* **(c)** The circuit in (b) with h_{21} neglected.

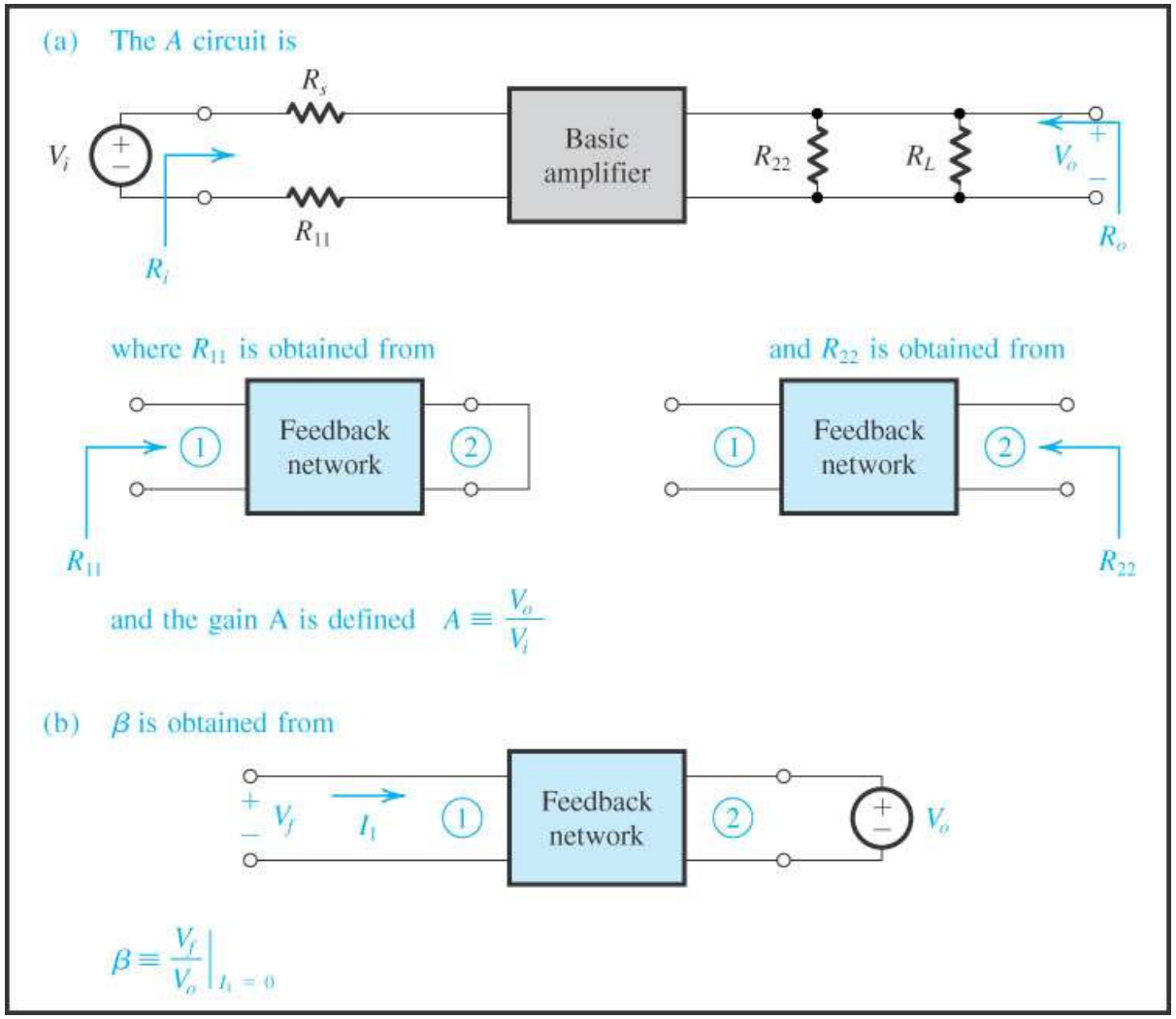


Figure 8.11 Summary of the rules for finding the A circuit and β for the voltage-mixing voltage-sampling case of Fig. 8.10(a).

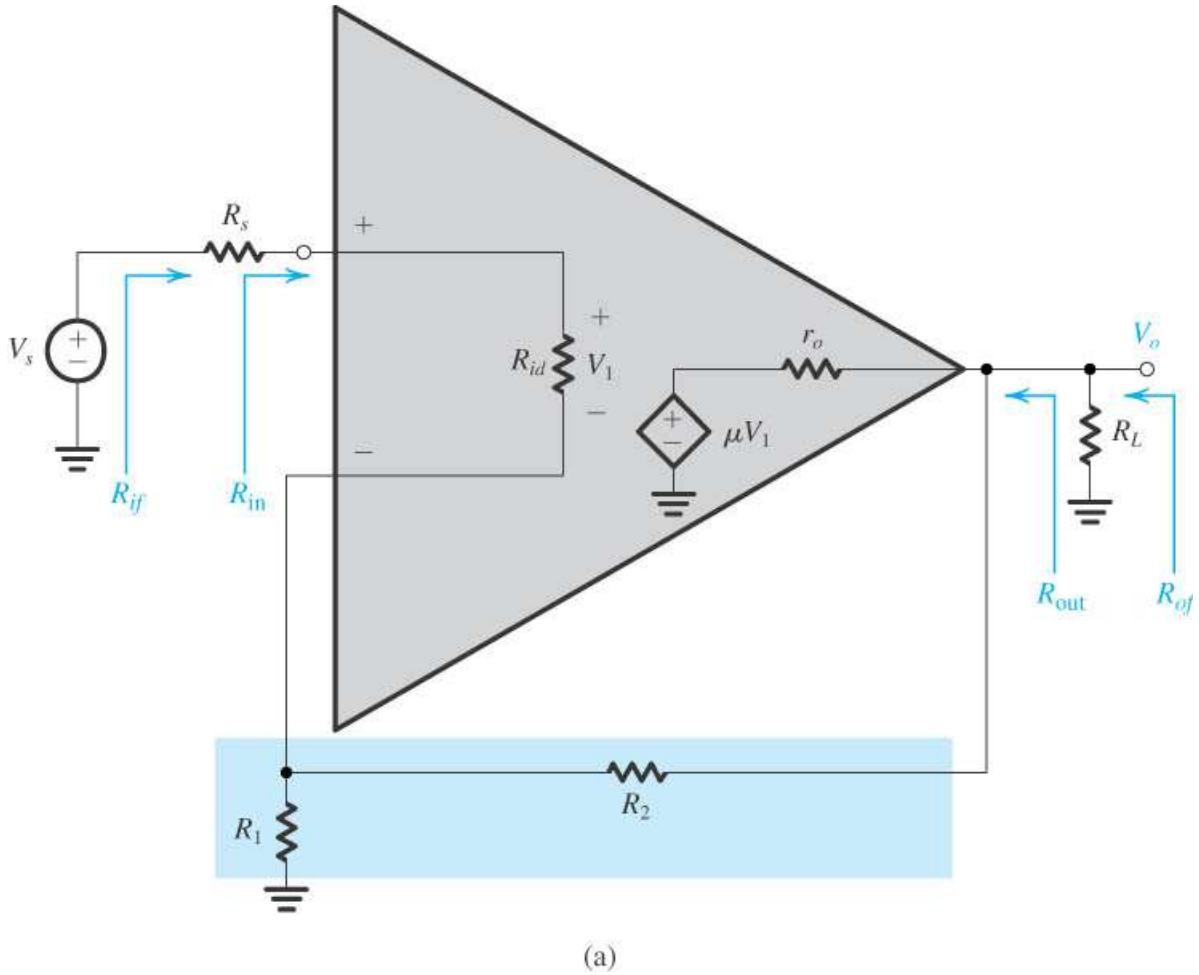
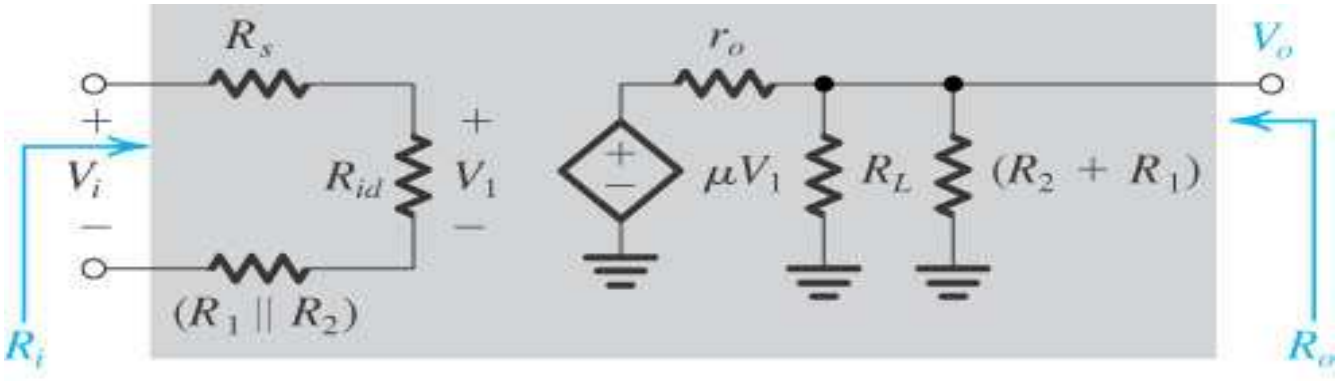
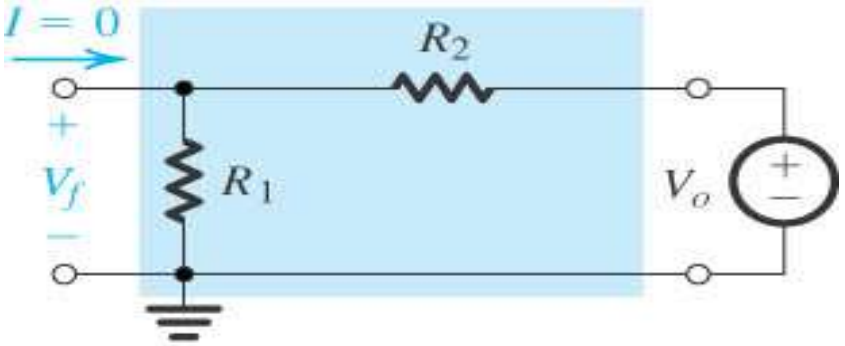


Figure 8.12 Circuits for Example 8.1.



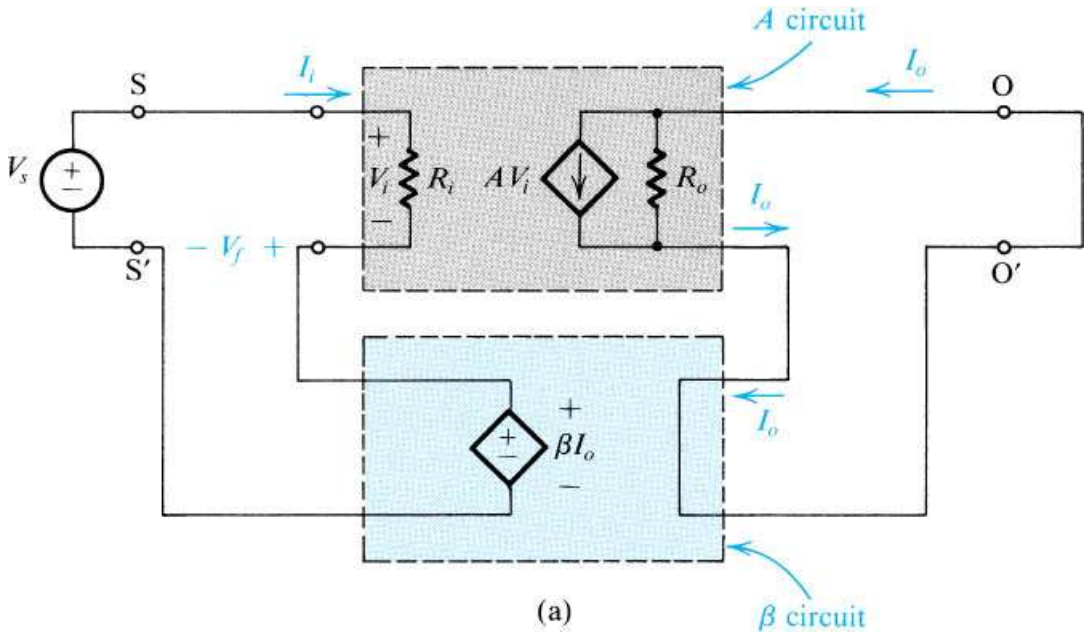
(b)



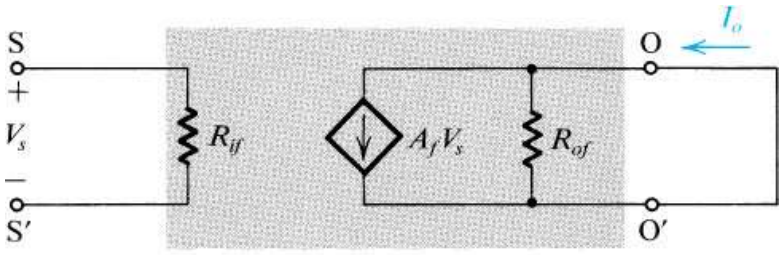
(c)

Figure 8.12 *(Continued)*

Figure 8.13 The series–series feedback amplifier: **(a)** ideal structure and **(b)** equivalent circuit.



(a)



(b)

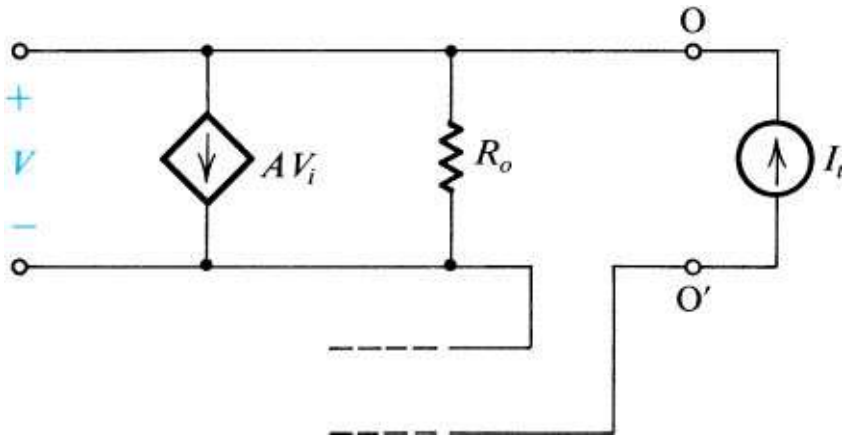
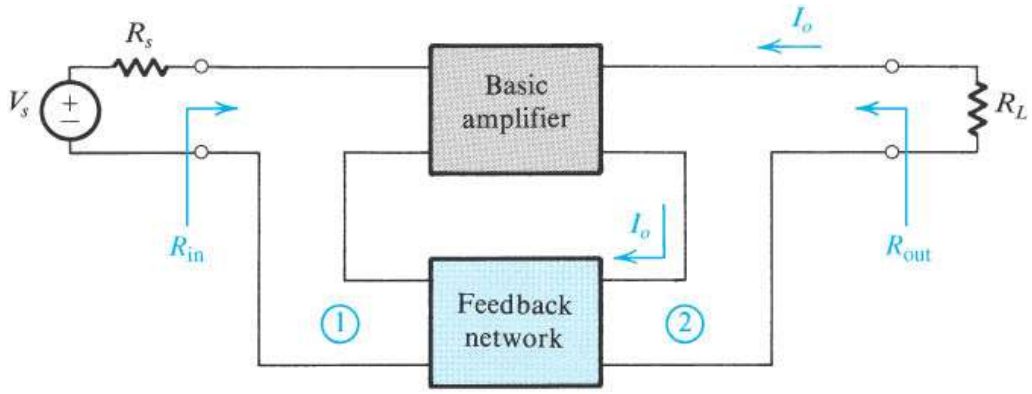


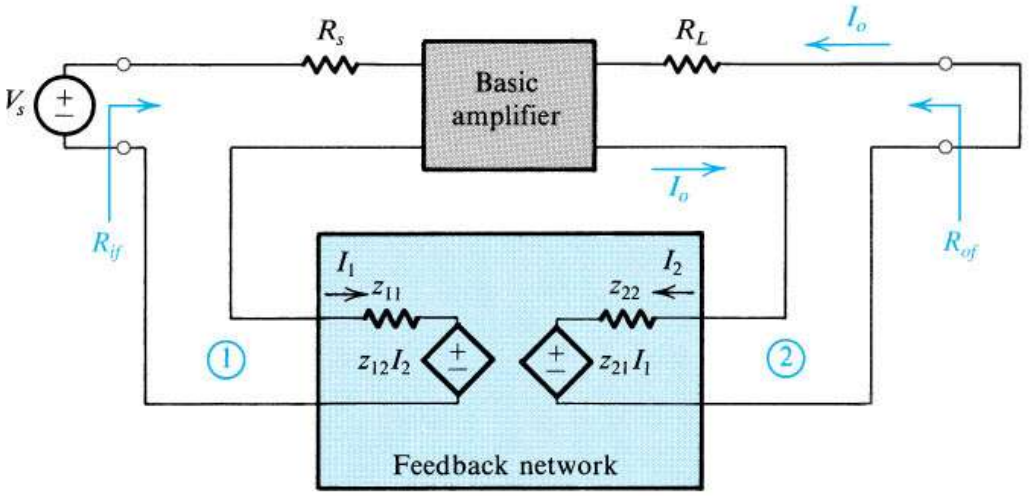
Figure 8.14 Measuring the output resistance R_{of} of the **series–series** feedback amplifier.

Figure 8.15. **(a)** A **series–series** feedback amplifier.

(b) The circuit of (a) with the feedback network represented by its ***z* parameters.**



(a)



(b)

Figure 8.15 *(Continued)* **(c)** A redrawing of the circuit in (b) with z_{21} neglected.

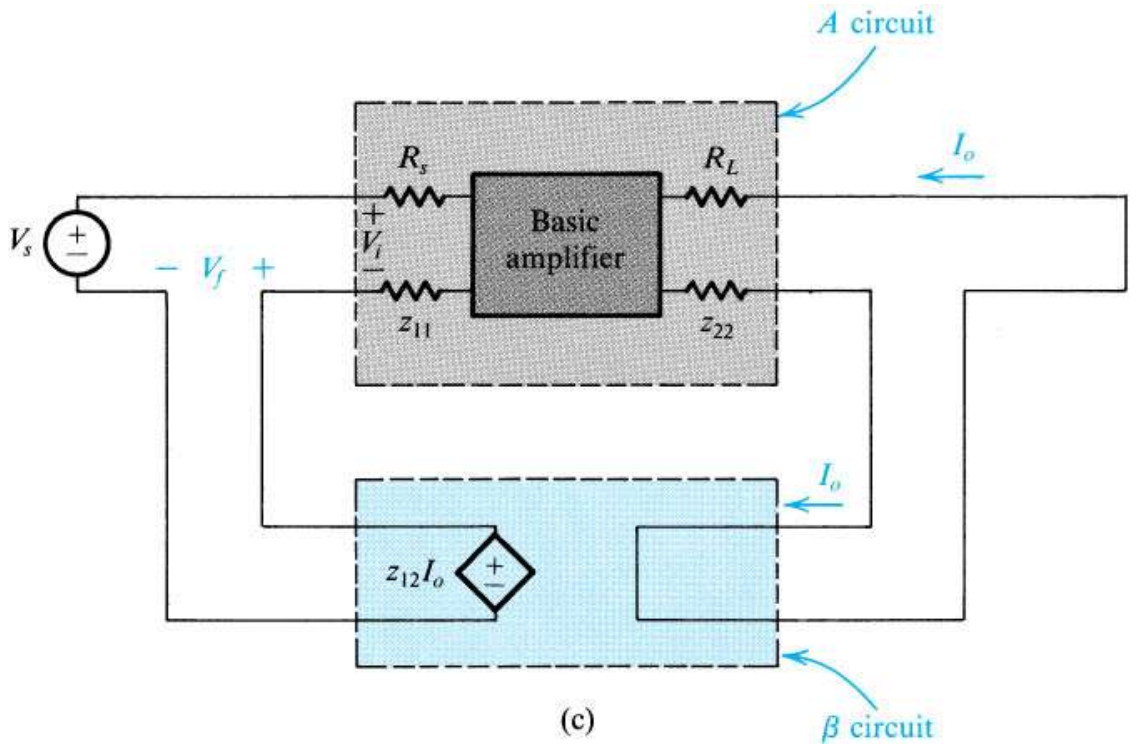
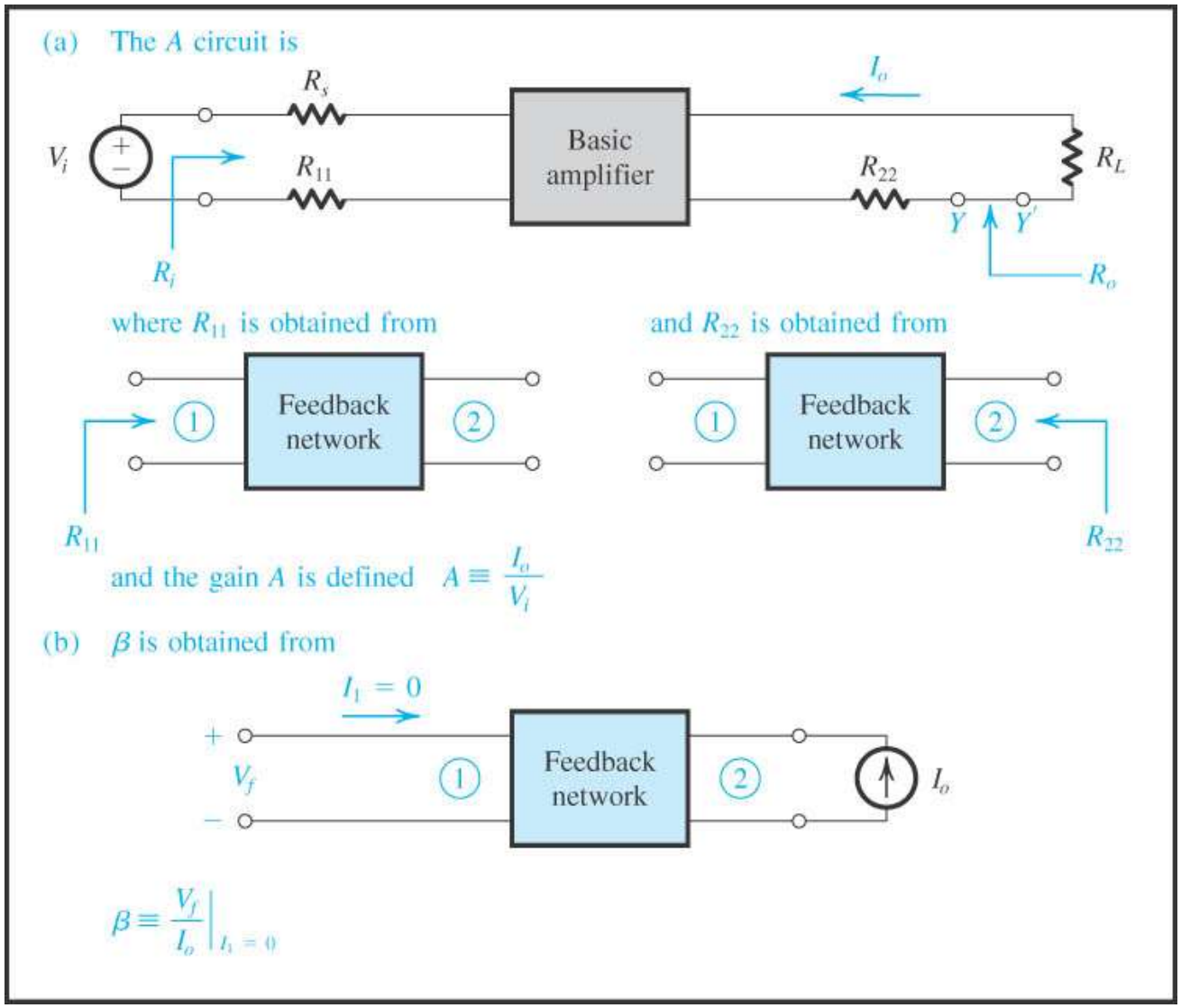


Figure 8.16 Finding the A circuit and β for the voltage-mixing current-sampling (**series–series**) case.



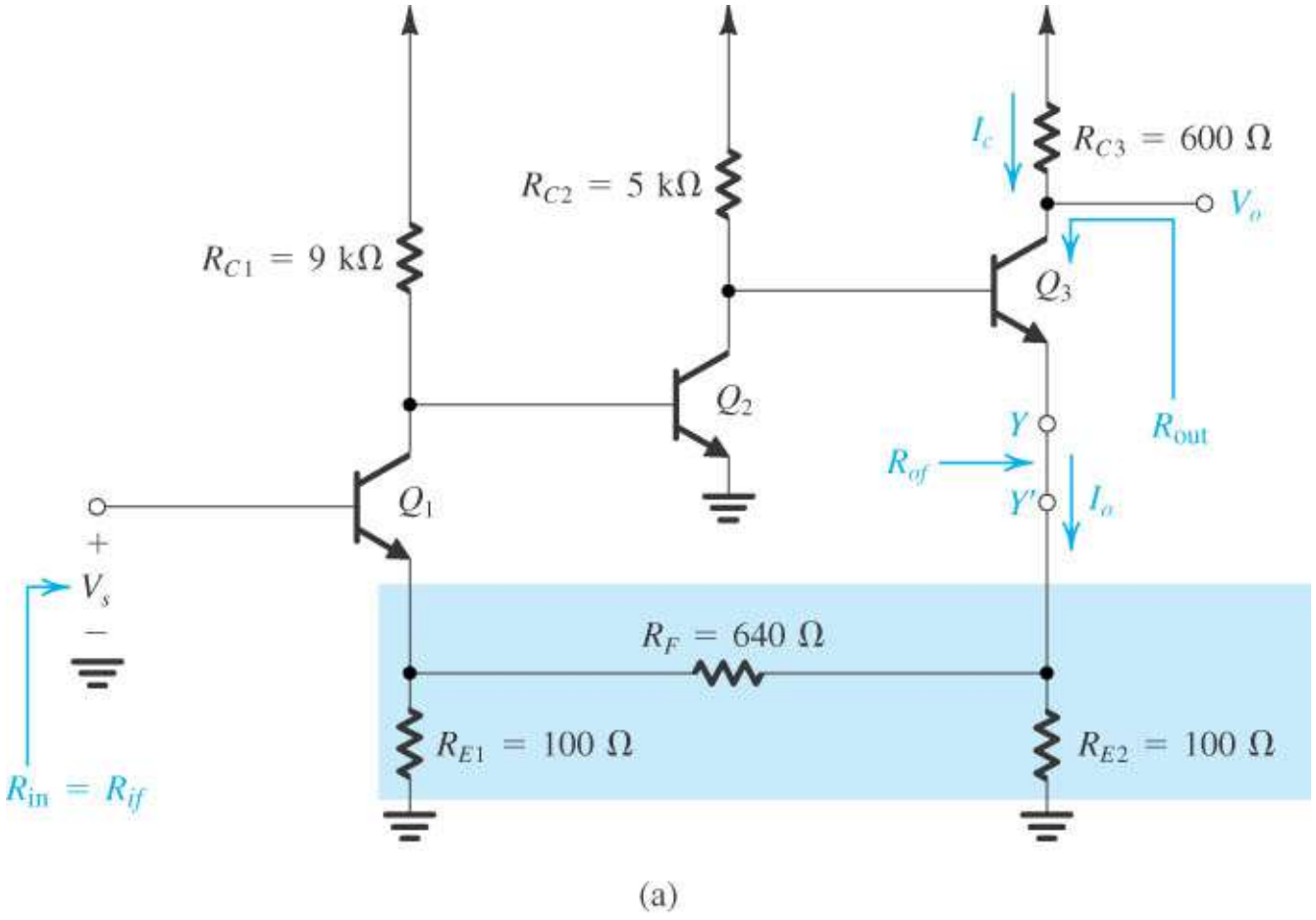


Figure 8.17 Circuits for Example 8.2.

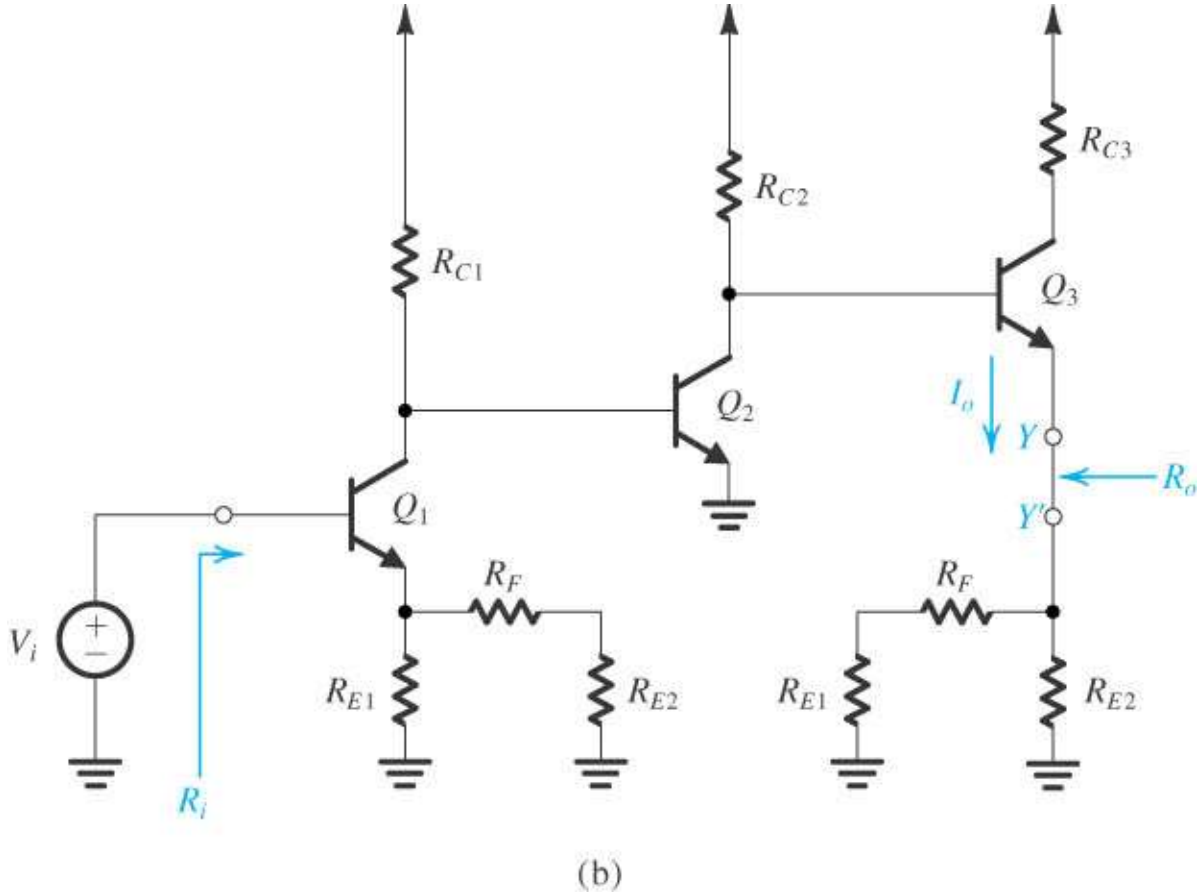


Figure 8.17 *(Continued)*

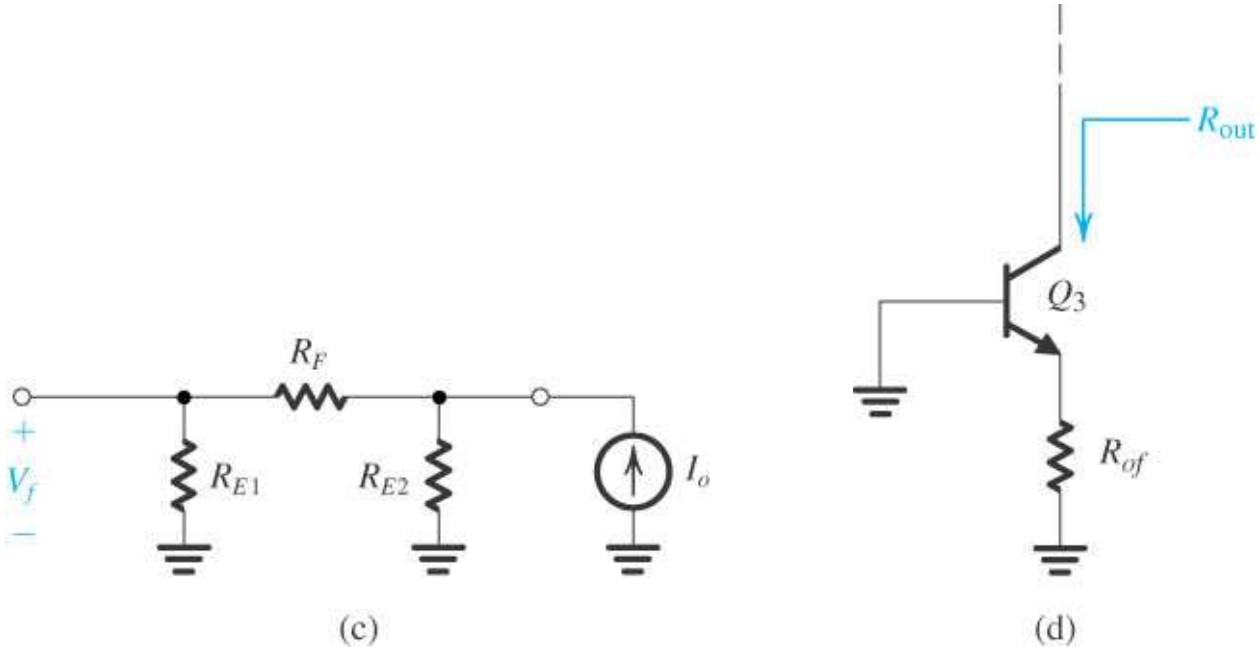


Figure 8.17 *(Continued).*

Figure 8.18 Ideal structure for the shunt–shunt feedback amplifier.

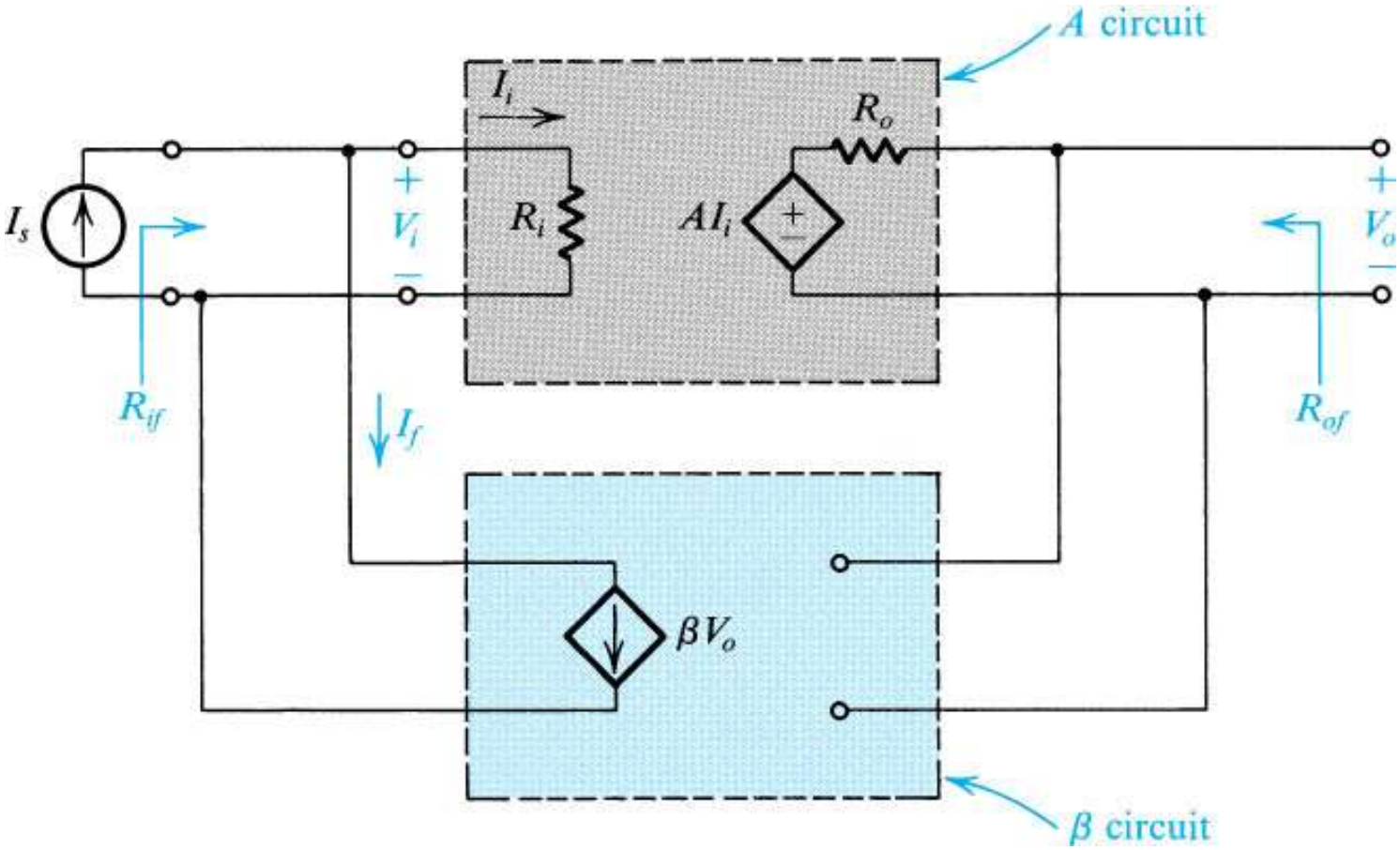


Figure 8.19 Block diagram for a practical shunt–shunt feedback amplifier.

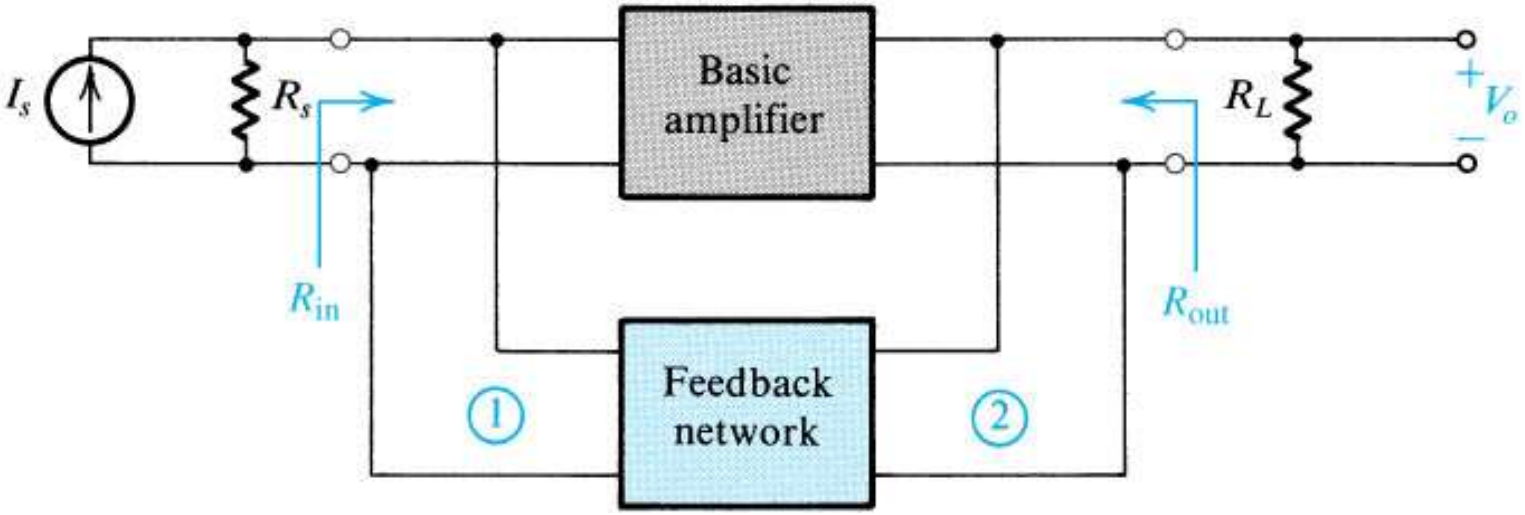
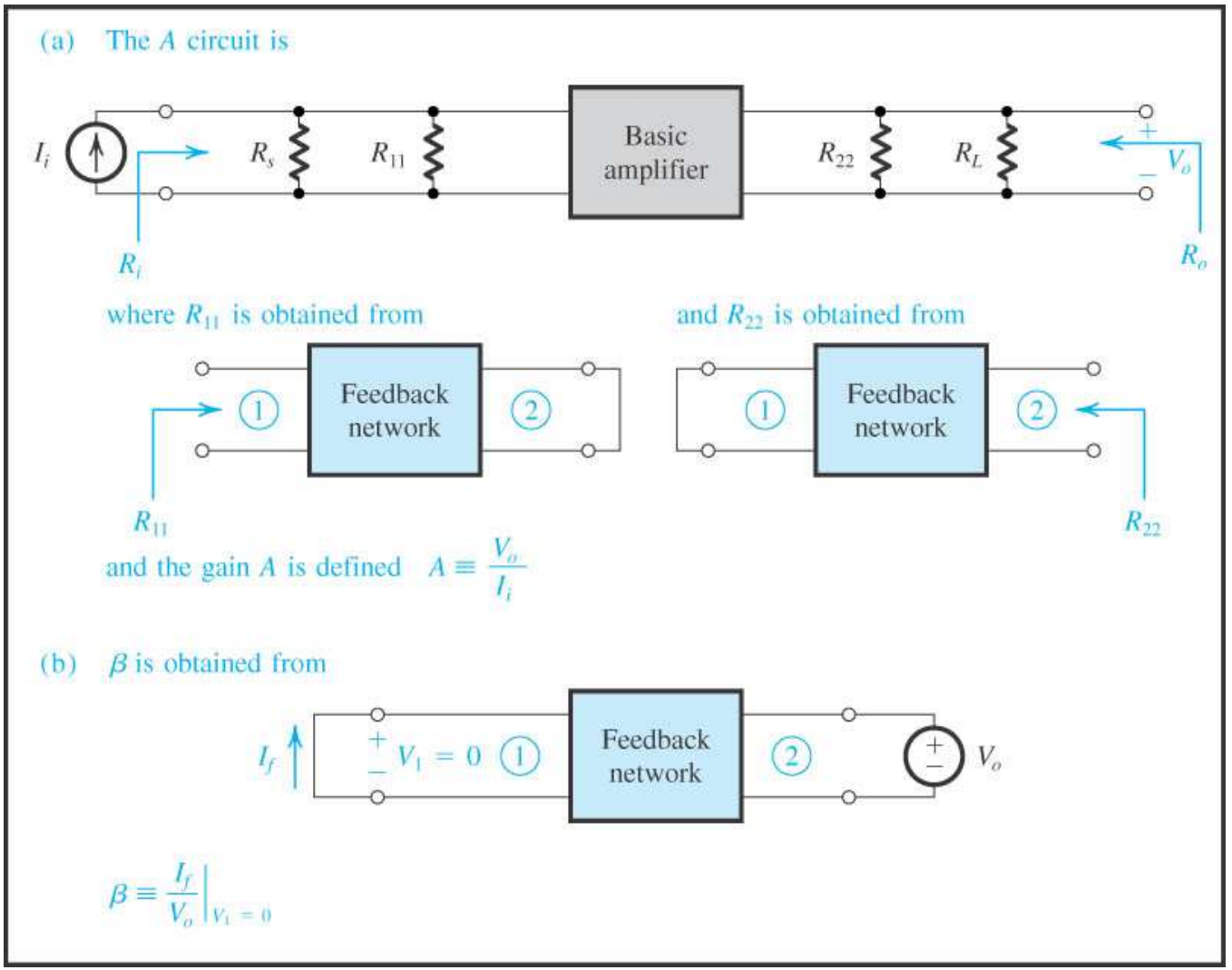


Figure 8.20 Finding the A circuit and β for the current-mixing voltage-sampling (**shunt–shunt**) feedback amplifier in Fig. 8.19.



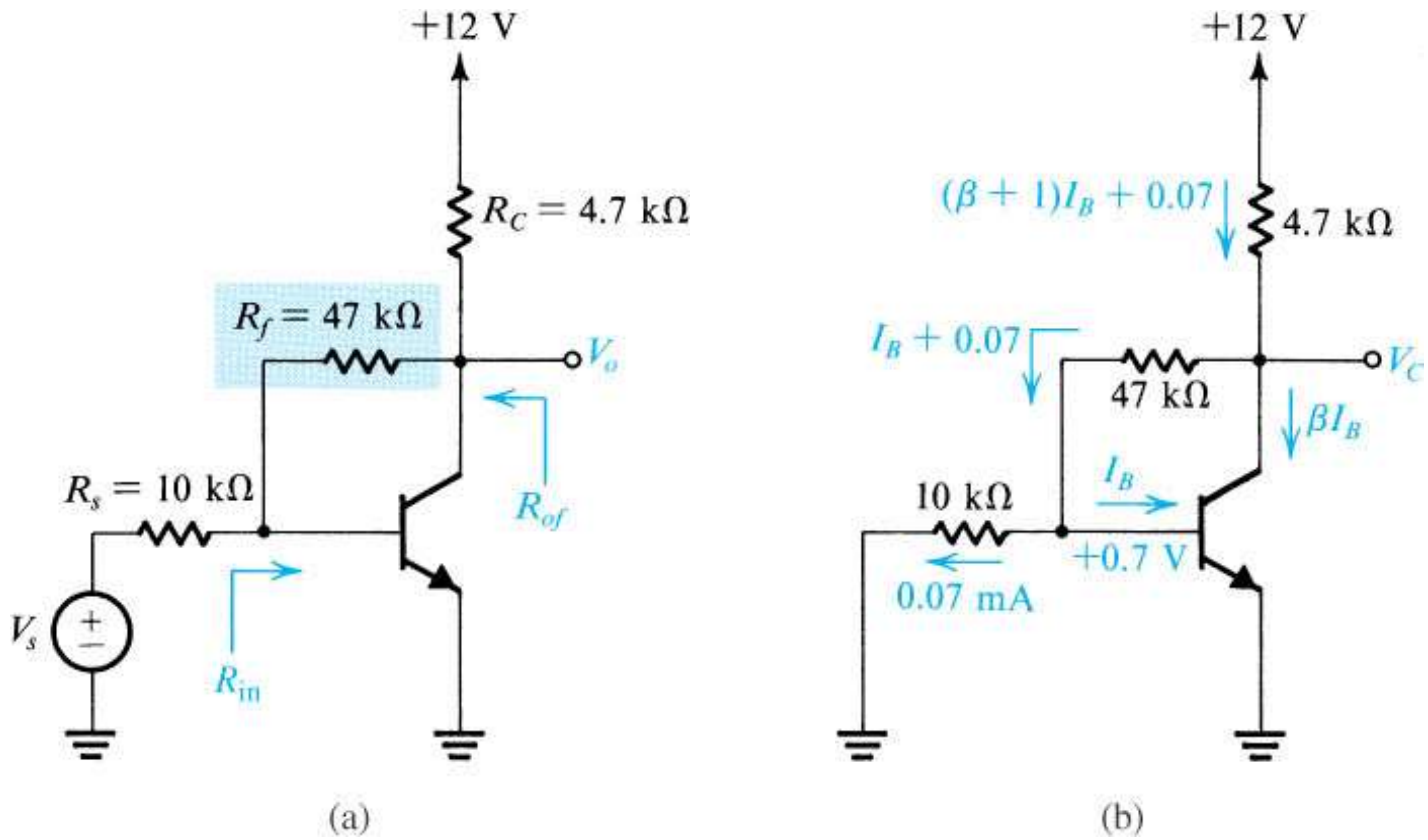


Figure 8.21 Circuits for Example 8.3.

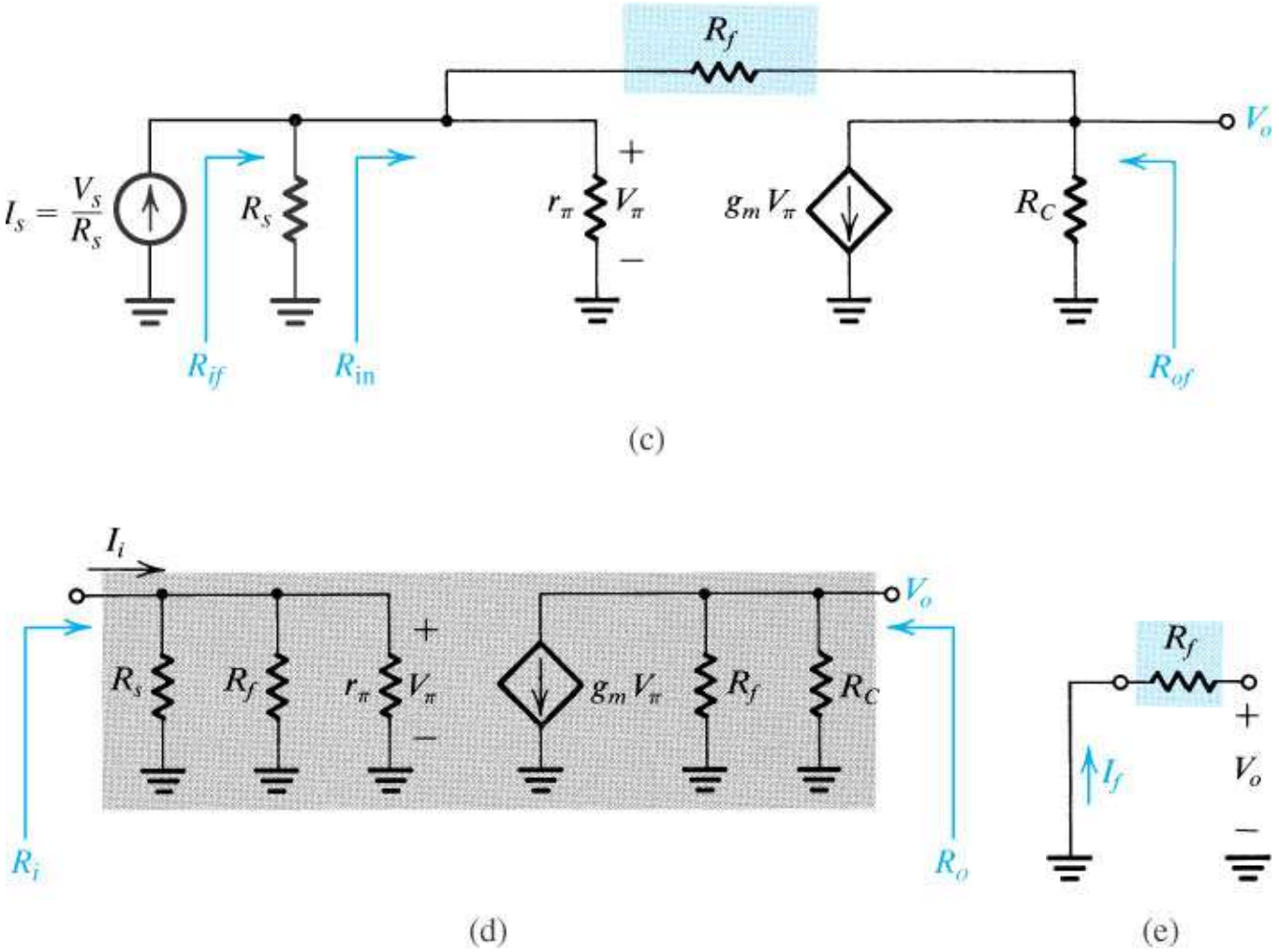
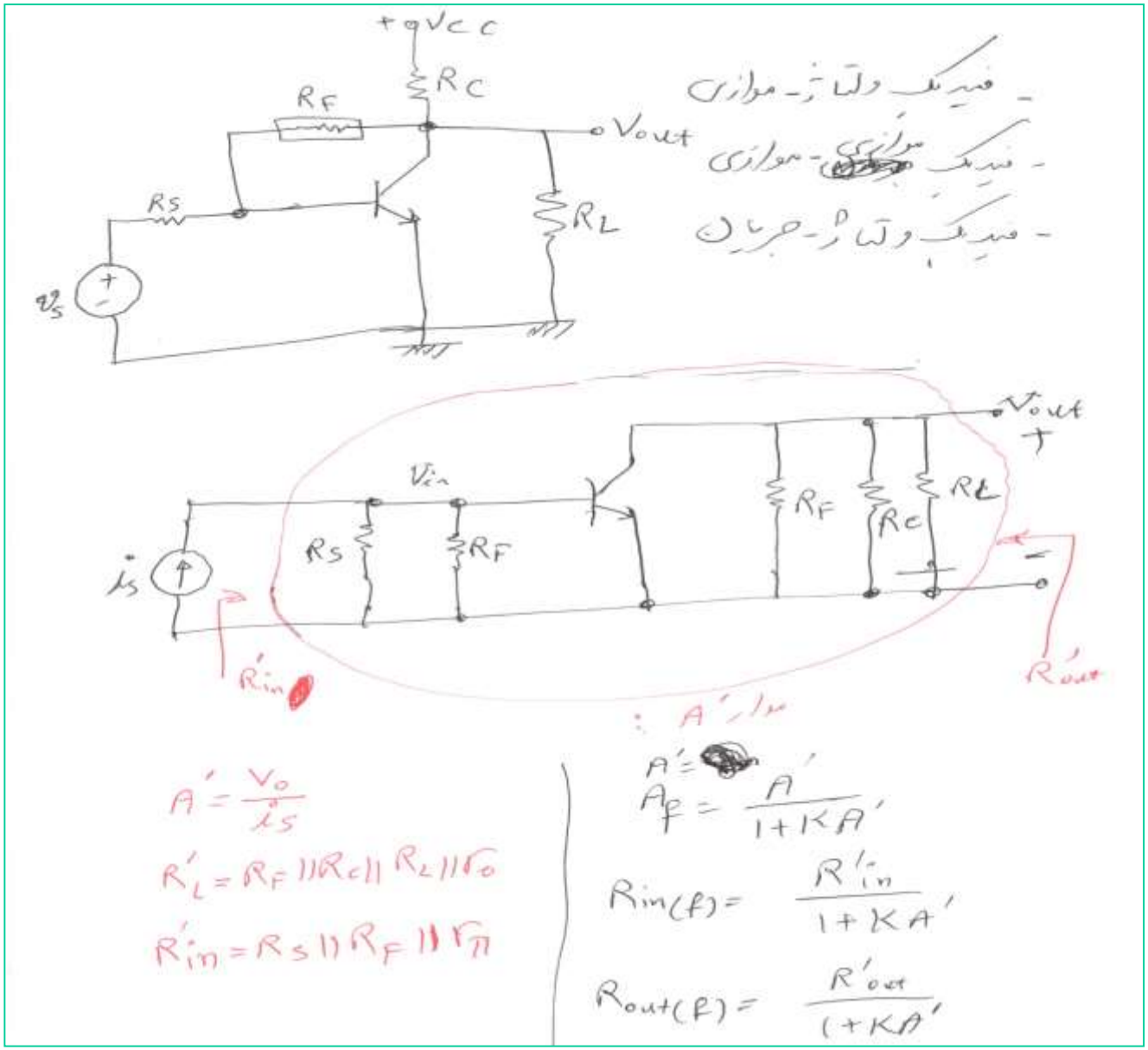


Figure 8.21 *(Continued)*



$$A' = \frac{V_o'}{i_s'} = -g_m R_{in}' \cdot R_{out}'$$

$$= \frac{V_o}{V_{in}} \cdot \frac{V_{in}}{i_s} = -g_m R_{out}' \cdot \left(R_{in}'\right) \equiv \cdots \text{kΩ}$$

$$\frac{V_o}{V_s} = \frac{V_o}{i_s R_s} = \frac{1}{R_s} \cdot \frac{V_o'}{i_s} = \frac{1}{R_s} \cdot A_{(f)}$$

Figure 8.22 Ideal structure for the **shunt–series** feedback amplifier.

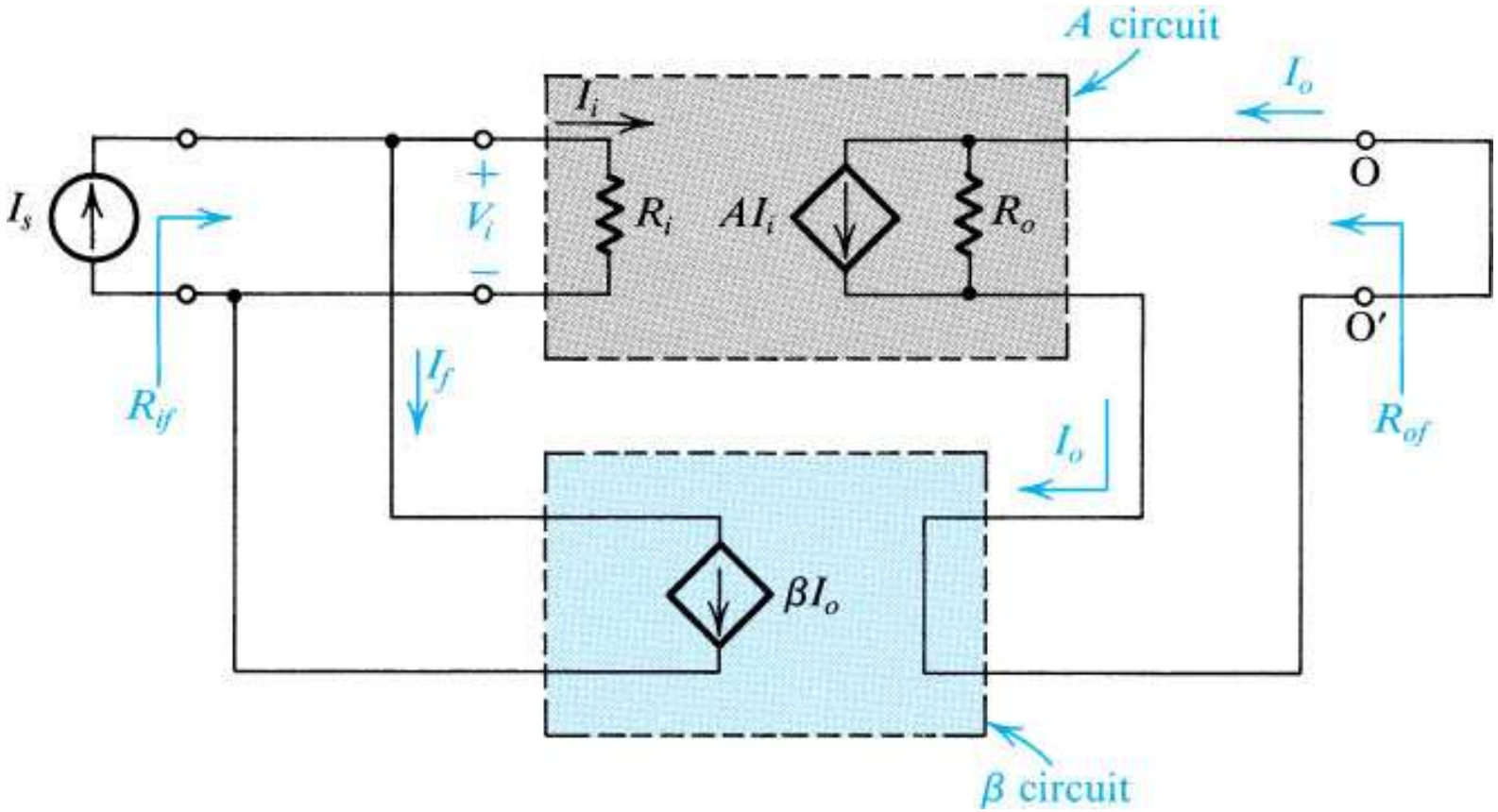


Figure 8.23 Block diagram for a practical shunt–series feedback amplifier.

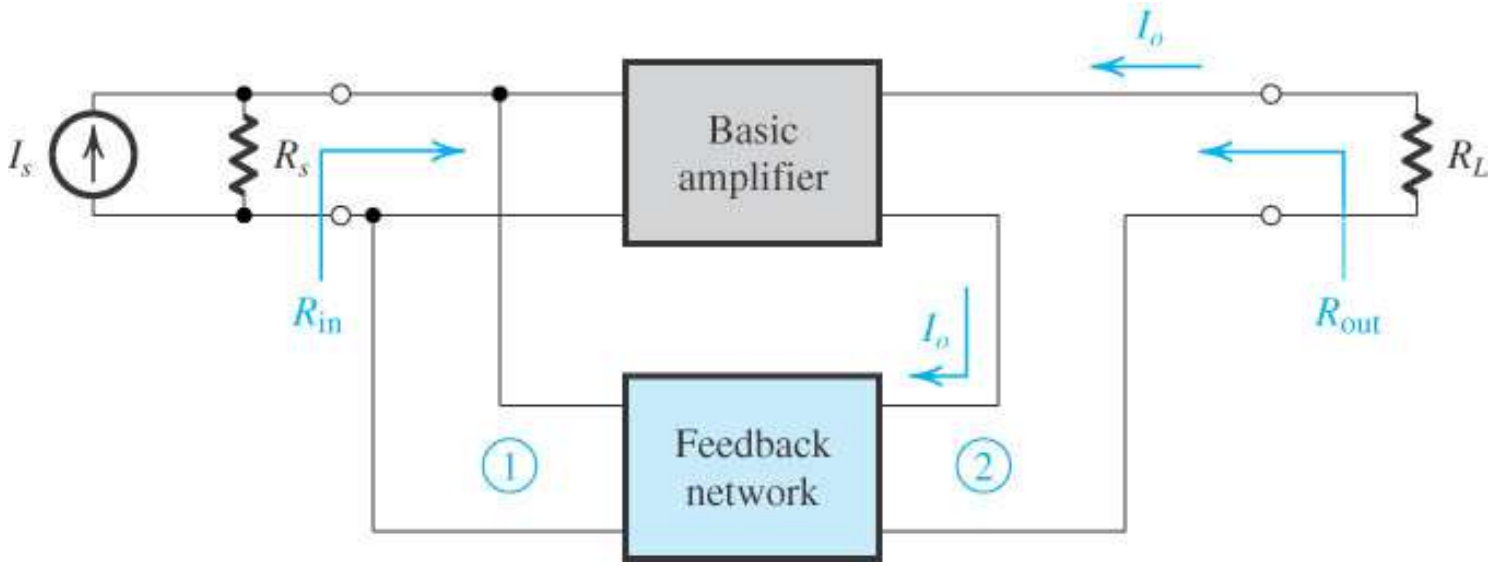
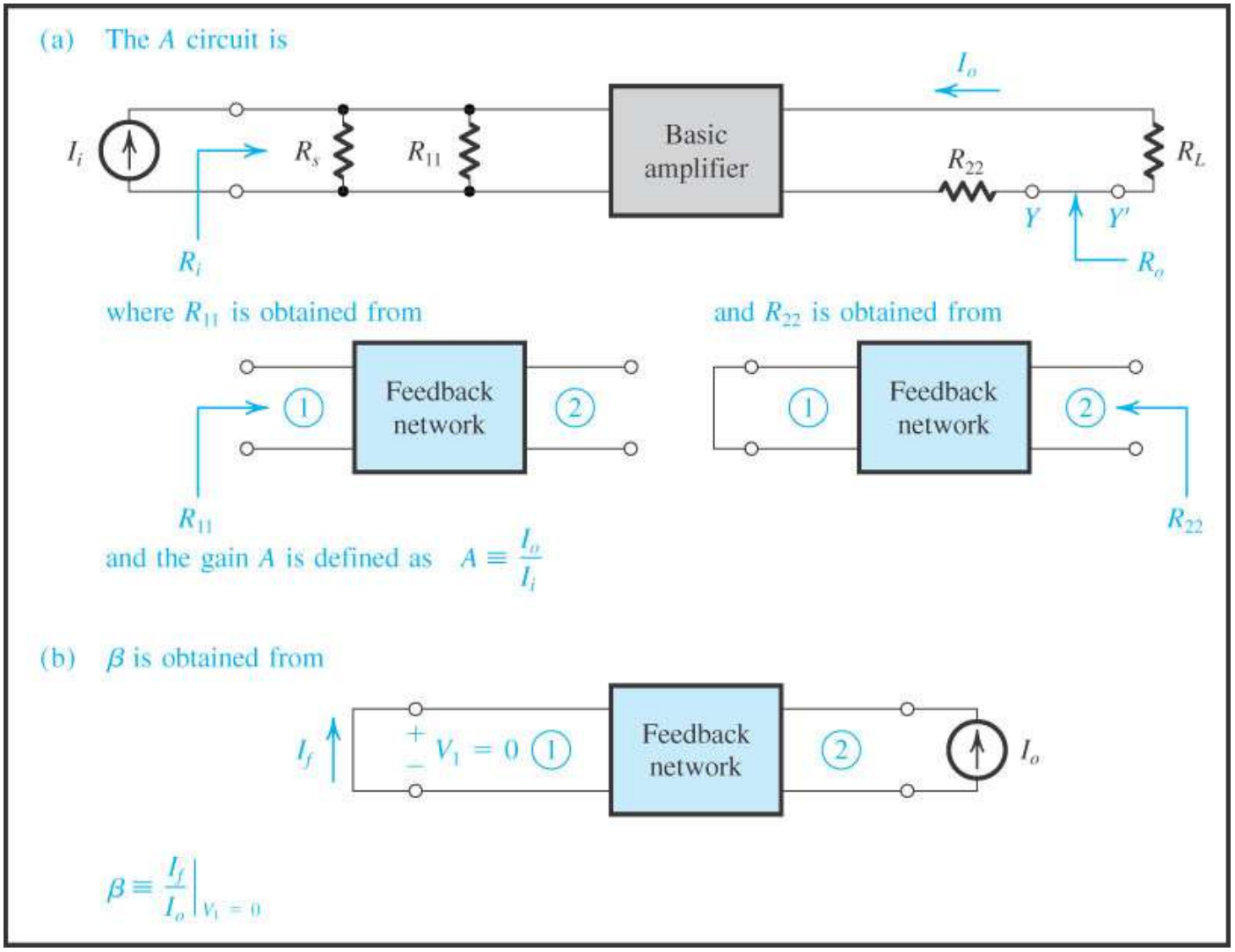


Figure 8.24 Finding the A circuit and β for the current-mixing current-sampling (**shunt–series**) feedback amplifier of Fig. 8.23.



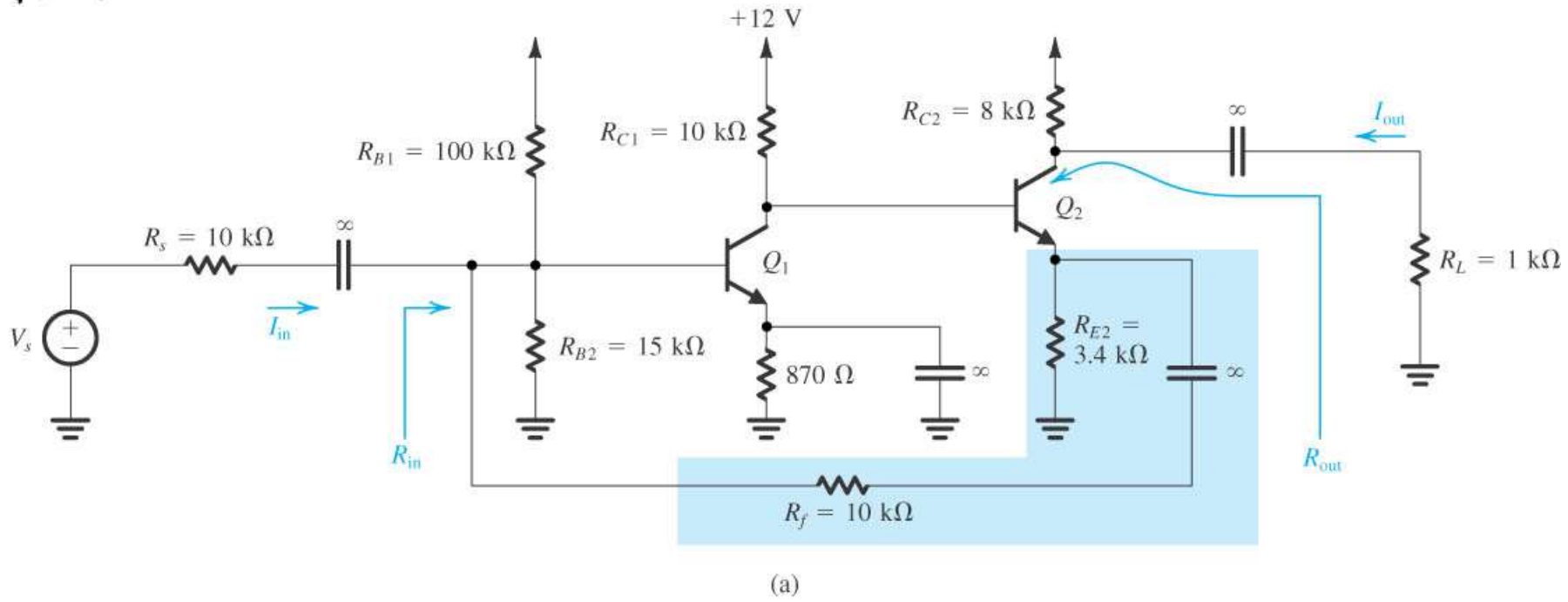
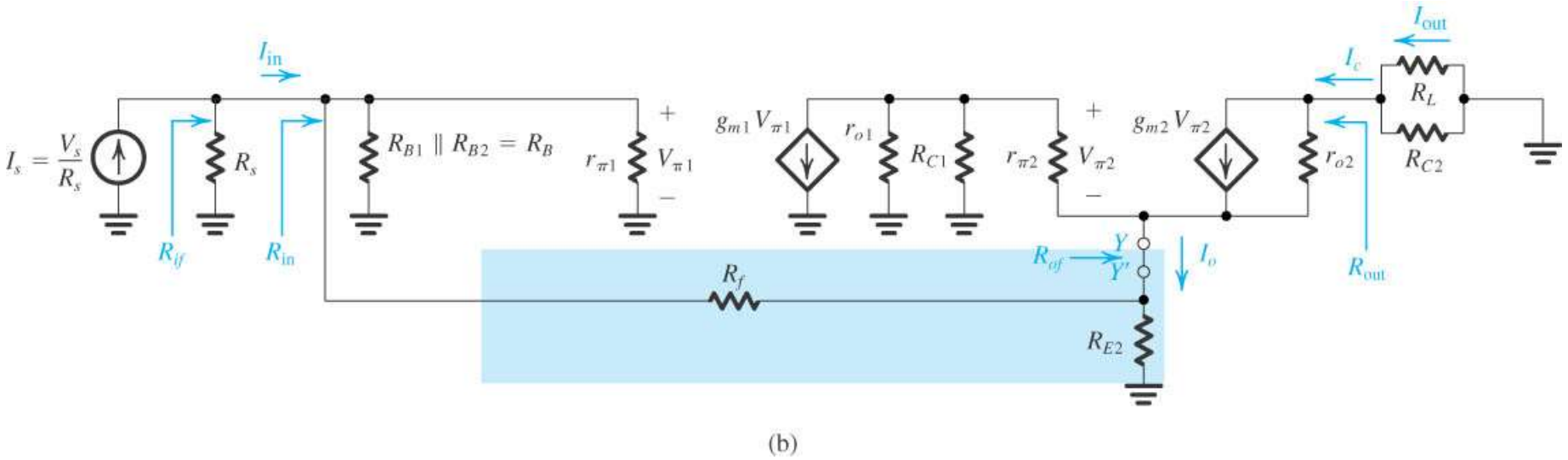


Figure 8.25 Circuits for Example 8.4.



(b)

Figure 8.25 *(Continued)*

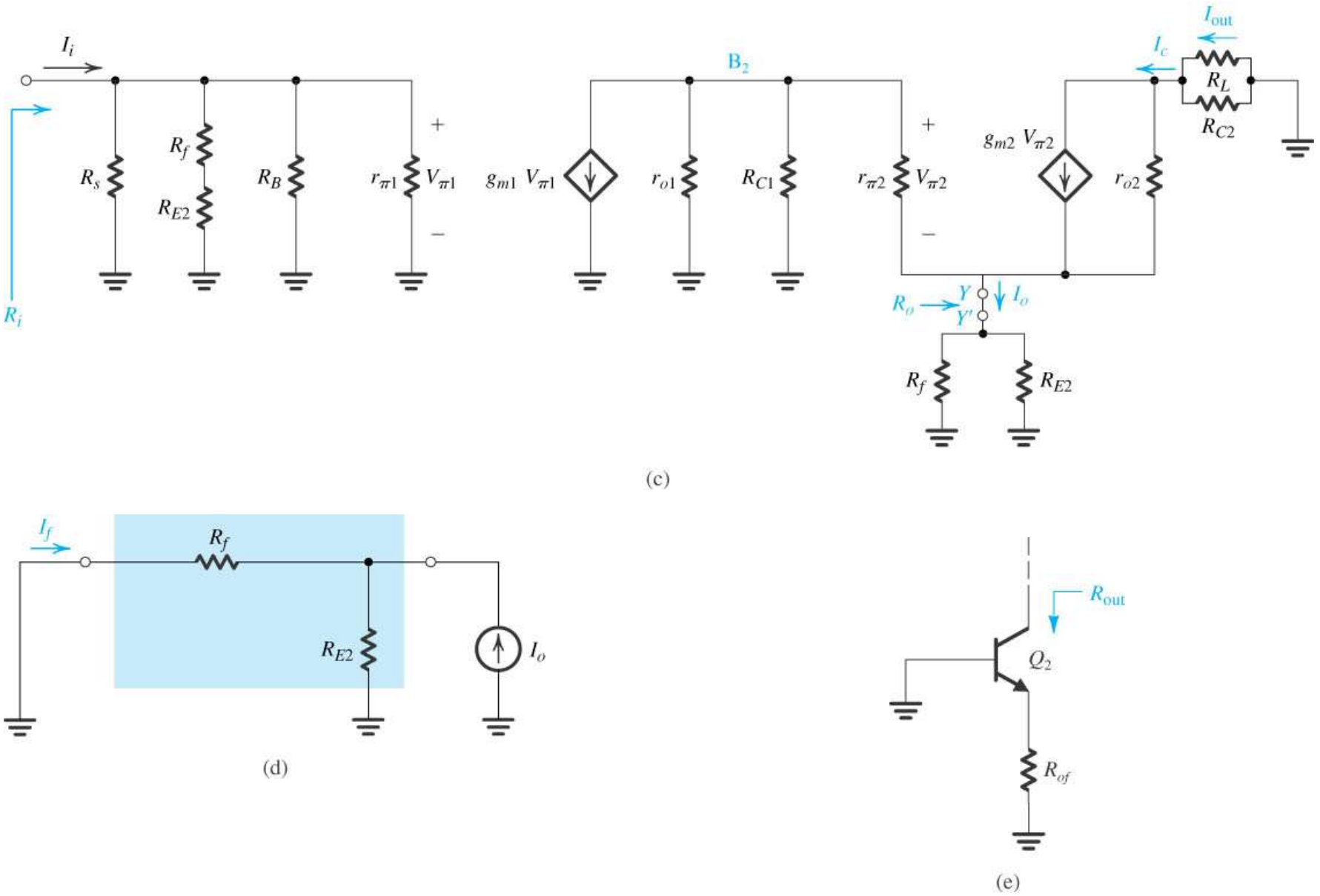


Figure 8.25 *(Continued)*

Figure 8.41 Circuit of the shunt–series feedback amplifier in Example 8.4.