Chapter 5, Solution 90.

The op amp circuit in Fig. 5.107 is a *current amplifier.* Find the current gain i_o/i_s of the amplifier.

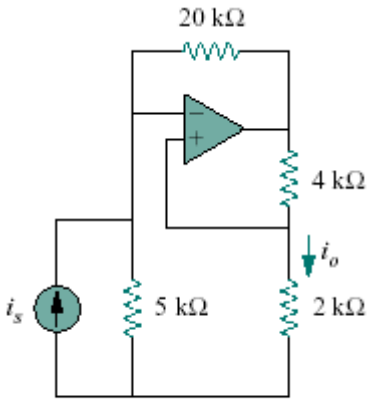
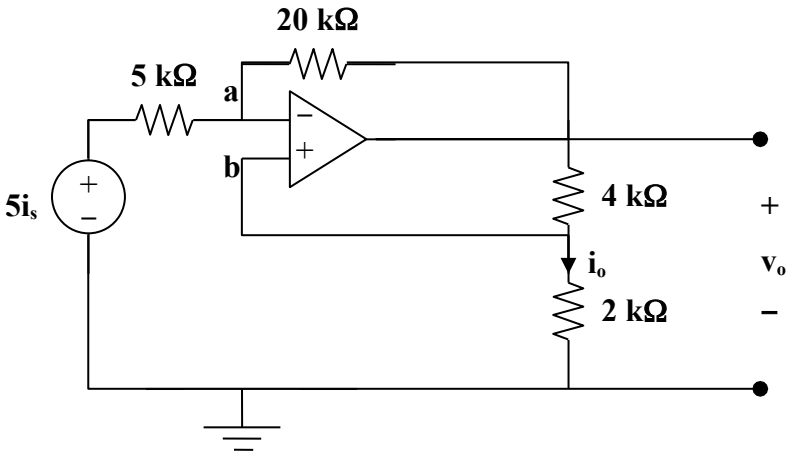


Figure 5.107
For Prob. 5.90.

Solution

Transforming the current source to a voltage source produces the circuit below,

At node b, $v_b = (2/(2+4))v_o = v_o/3$



At node a, $(5i_s - v_a)/5 = (v_a - v_o)/20$

But $v_a = v_b = v_o/3$. $20i_s - (4/3)v_o = (1/3)v_o - v_o$, or $i_s = v_o/30$

$i_o = [(2/(2+4))/2]v_o = v_o/6$

$$i_o/i_s = (v_o/6)/(v_o/30) = \mathbf{5}$$