

Chapter 5, Solution 43.

A four-input summing amplifier has $R_1 = R_2 = R_3 = R_4 = 80 \text{ k}\Omega$. What value of feedback resistor is needed to make it an averaging amplifier?

Solution

In order for

$$v_o = \left(\frac{R_f}{R_1} v_1 + \frac{R_f}{R_2} v_2 + \frac{R_f}{R_3} v_3 + \frac{R_f}{R_4} v_4 \right)$$

to become

$$v_o = -\frac{1}{4}(v_1 + v_2 + v_3 + v_4)$$

$$\frac{R_f}{R_i} = \frac{1}{4} \longrightarrow R_f = \frac{R_i}{4} = \frac{80\text{k}\Omega}{4} = \mathbf{20 \text{ k}\Omega}$$