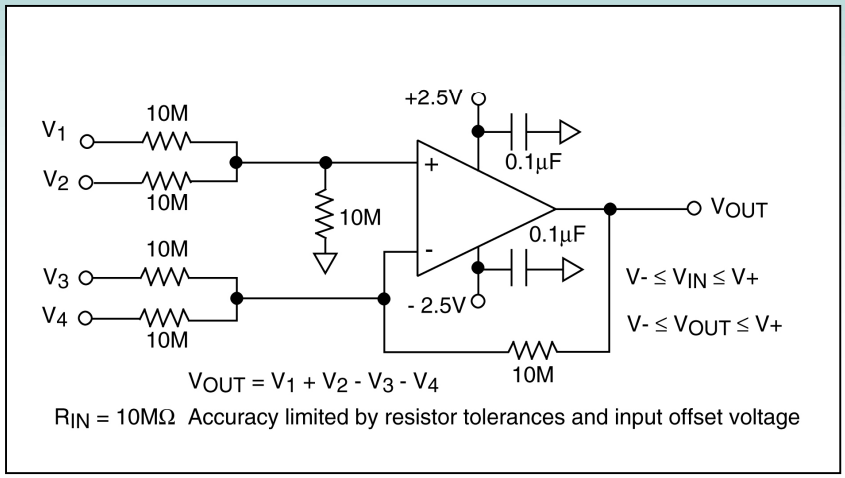
Category: Amplifiers **CIRCUIT IDEAS FOR DESIGNERS** Schematic no. amp_27001.0

High Input Impedance DC Summing Amplifier



Description

This circuit presents a simple DC summing amplifier that has high input impedance of 10Mohm. The obvious advantage is the high input resistance of the summing resistor(s) reduces the loading on the input signal sources and therefore affords better signal accuracy and integrity. However, when high value input resistors are used, the input leakage currents to the operational amplifier must be significantly lower than the lowest input signal currents available such that the accuracy of the summing amplifier is preserved. In this example, a 10Mohm resistor is used as a basic summing amplifier input resistor. To determine an input signal resolution, assume a "signal current" available is equal to 10pA, which computes to 10Mohm x 10pA =100µV. The input leakage current of the operational amplifier therefore limits the input voltage resolution and the minimum discernable voltage signal. A CMOS operational amplifier with very low input-leakage current specifications guaranteed would be required for this application. Using the same line of reasoning, a 10µV signal resolution would require either 1pA max. input leakage current or a 1Mohm input resistor (instead of a 10Mohm input resistor). The input offset voltage of the operational amplifier would limit input voltage resolution as well. Select an operational amplifier with suitable input offset voltage and a guaranteed input leakage current for this application.

Recommended Components

ALD1701, ALD1702, ALD1704
½ ALD2701, ½ ALD2702, ½ ALD2704

Other Related Circuit Ideas

Schematic no. amp_27002.0 Low Voltage High Input Impedance Precision DC Summing Amplifier
Schematic no. amp_27003.0 High Input Impedance Precision DC Summing Amplifier