EN-3212 Electronics

Signal Conditioning Practice

This first example gives you good idea of how this works. The two practice problems after it will give you a better idea of what you'll see on your quiz or exam.

To build your circuit, you can use as many operational amplifiers as needed, standard resistors, one of three DC voltage sources (6V, 12V, 36V), and one 10kΩ potentiometer.

You build a sensor circuit the puts out voltages between 4V and 6.2V. You have to connect it to an AD converter that accepts input voltages between 0V and 3V. We can do this any number of ways but it's easiest if we make the relationship between these voltages linear.

The transfer function:

Once we have the transfer function, you can build the circuit.

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For practice:

1) A sensor outputs voltages from -1V to 0.3V. You have to connect it to an AD converter that accepts a voltage range from 0V to 1V. Your circuit uses a 9 volt source.

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2) A sensor outputs voltages from 2mV to 7mV. You have to connect it to an AD converter that accepts a voltage range from 0V to 5V. Your sensor uses an 18 volt source.

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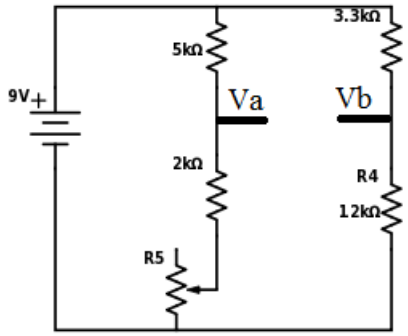
This last one is for practice and fun. Let's pull everything together!

You are given a 10kΩ potentiometer that has a resistance of 0kΩ at 0˚ and a resistance of 10kΩ at 120˚. Find the transfer function for this device.

The potentiometer is placed in the following circuit as R5 and find the range for Vab.



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Build the op-amp circuit to connect it to an AD converter that requires a 0V-3V input.