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19D070052

Expt7

Q1. Three Op-Amp Amplifier

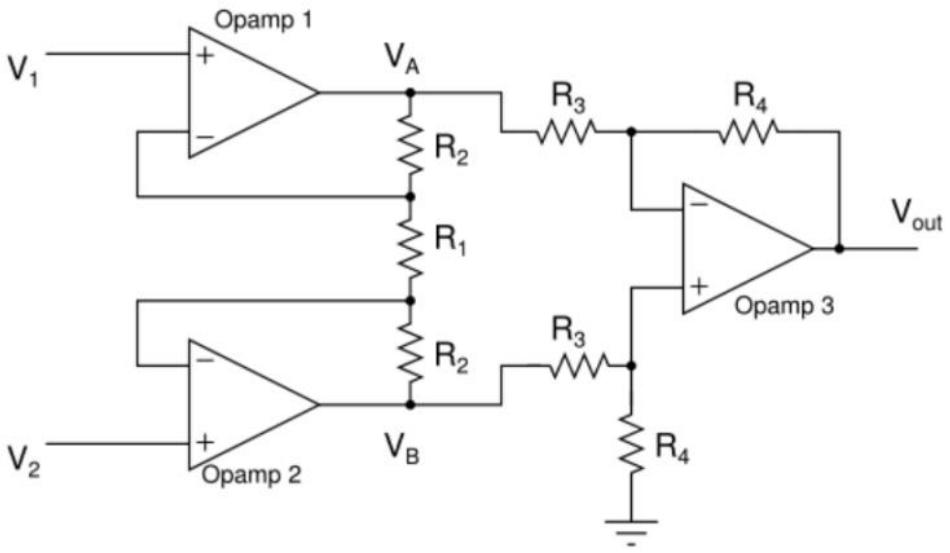

Fig.3 Three-Opamp Instrumentation Amplifier

- Q1. In Sec 3.2 and 3.3, even under no-load conditions Vout was found to be non-zero. Give one or two reasons for this:
    - The reason is that the wheatstone bridge isn't perfectly ideal. Therefore even under no load, Vout will be non-zero due to imperfectly matched resistances.

- Q2. Give two or three major advantages of the three-Op Amp instrumentation amplifier as compared to the single-Op Amp difference amplifier of Experiment 6:
    - Input resistance is much higher compared to the difference amplifier.
    - Gains of higher magnitude can be achieved.
    - In order to vary the gain, we can vary R1. This is better than vary 2 resistors in ratio, and ensuring matching as in the case of the differential amplifier.

Q2. Non-inverting Amplifier

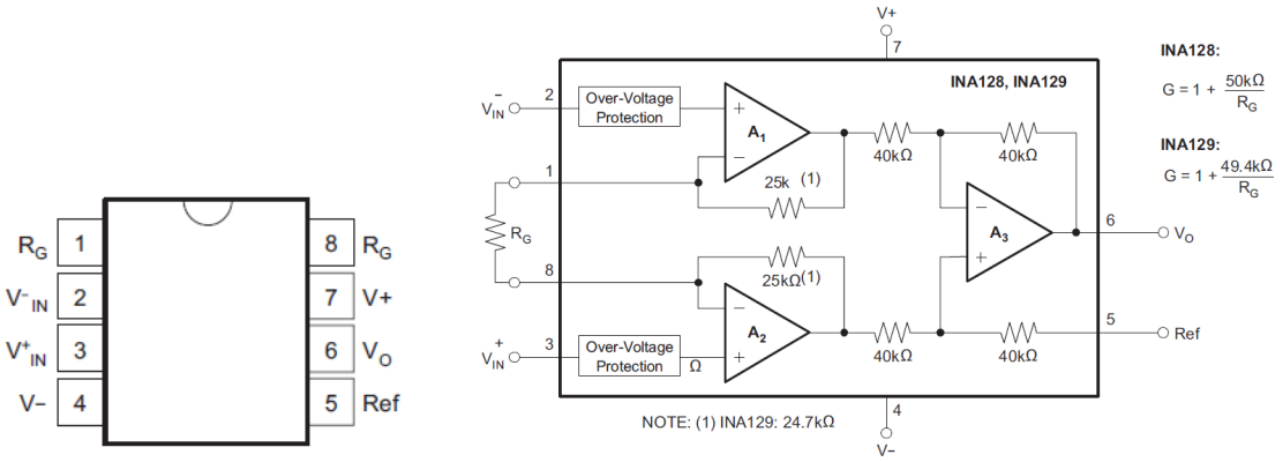

Fig.2 INA128 Instrumentation Amplifier pinout diagram

- Q3. Look at the data sheets of TL084 and INA128. Identify the major differences between these two ICs – i.e. Op Amp parameters crucial for difference amplifier applications, such as the Loadcell application discussed in this experiment:
    - Offset voltage is lower and matching is better for INA128. Hence no-load output is closer to 0.
    - The gain is larger for INA128.

- Q4. Identify one or two parameters of the INA128 that makes it superior to the TL084 based instrumentation amplifier.:
    - The offset voltage of INA128 is significantly lower than that of TL084 (50 uV vs 3mV)
    - The common mode gain is also much lower for INA128, and hence the CMRR is higher (120dB).

Learnings:

- I learned how instrumentation amplifiers are a better alternative to differential amplifiers.
- I understood the advantages of INA128 over TL084.