# EE230: Lab 6
# Non-idealities in Op-Amp

Prateek Garg, 20D070060

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## 1 Overview of the experiment

### 1.1 Aim of the experiment

Measure the types of non-idealities like offset voltage and current in an op-amp(UA741) and also to find open loop gain by making circuits on bread-board .

### 1.2 Methods

The goal was to formulate and measure the offset voltage, bias currents and DC open-loop gain that affect the characteristics of a non-ideal op-amp. We used various circuits to neglect effect of two things to approximate the third non ideality as given in labsheet.

# 2 Design

## 2.1 Offset Voltage and Bias Currents

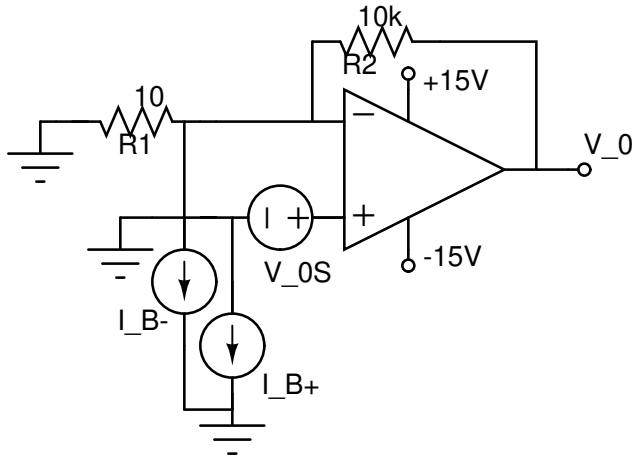


Figure 1: Circuit for measurement of $V_{OS}$

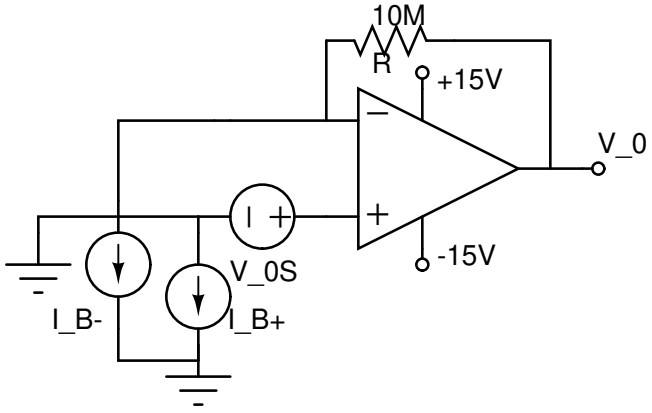


Figure 2: Circuit for measurement of $I_B^-$

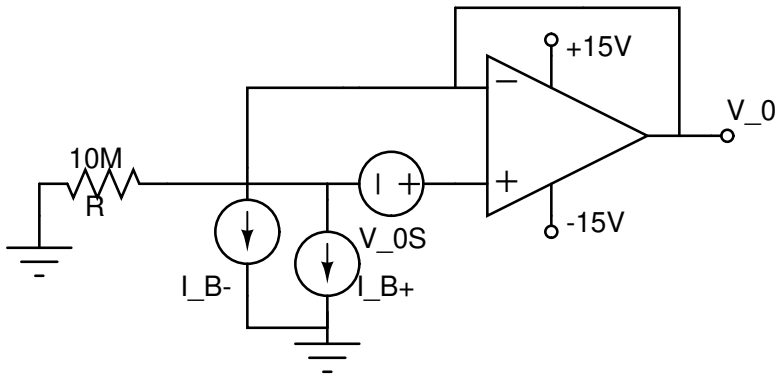


Figure 3: Circuit for measurement of $I_B^+$

## 2.2 DC Open Loop Gain

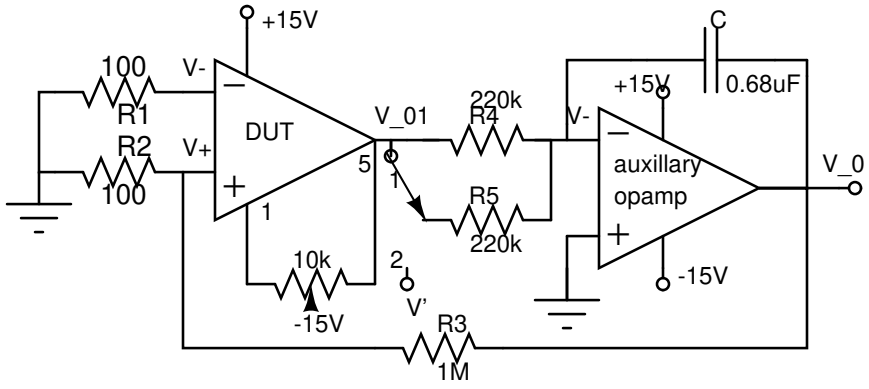


Figure 4: Circuit for measurement of $A_{OL}$

# 3 Experimental results

Table 1: Offset Voltage

| Characteristic | Observed |
|---|---|
| $V_o$ | $\approx$ 0.3V |
| $V_{OS}$ | $\approx$ 0.3mV |

Table 2: Ib-

| Characteristic | Observed |
|---|---|
| $V_o$ | $\approx$ 0.213V |
| R | $\approx$ 10M$\Omega$ |
| $I_B^-$ | $\approx$ 21.6nA |

Table 3: Ib+

| Characteristic | Observed |
|---|---|
| $V_o$ | $\approx$ -0.382V |
| R | $\approx$ 10M$\Omega$ |
| $I_B^+$ | $\approx$ -38.2nA |

Table 4: Readings

| $V'$ | $V_{oB} - V_{oA}$ | $A_{OL}$ |
|---|---|---|
| 1 $V$ | $-119$ $mV$ | $8.33 \times 10^4$ |
| 2 $V$ | $-153$ $mV$ | $12.98 \times 10^4$ |
| 3 $V$ | $-198$ $mV$ | $15 \times 10^4$ |