EE230:experiment No.6
Non-idealities of opamp measurement

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1 Overview of the experiment

1.1 Aim of the experiment

1.To measure offset voltage of a non ideal opamp
2.To measure bias currents and offset current of non-ideal opamp
3.Meaurement of DC open loop gain A_{ol}

1.2 Method

1.2.1 measurement of offset voltage (V_{os})

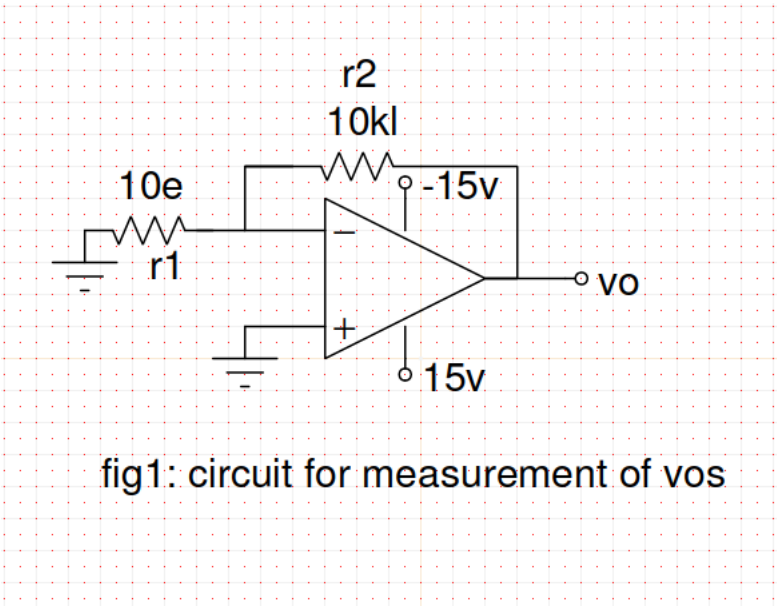

fig1: circuit for measurement of vos

circuit is connected as shown in figure , now for measurement of v_{os} we use this formula :
$v_{os} = V_0/(1 + R_2/R_1)$
For measurement we have done we got values for V_0 as 1.09v,thus
$v_{os} = 1.08v/(1 + 10k/10) = 1.09mv$
In the datasheet ,typical value=1mv and max possible value=5mv and hence we can say that our possible value is correct.

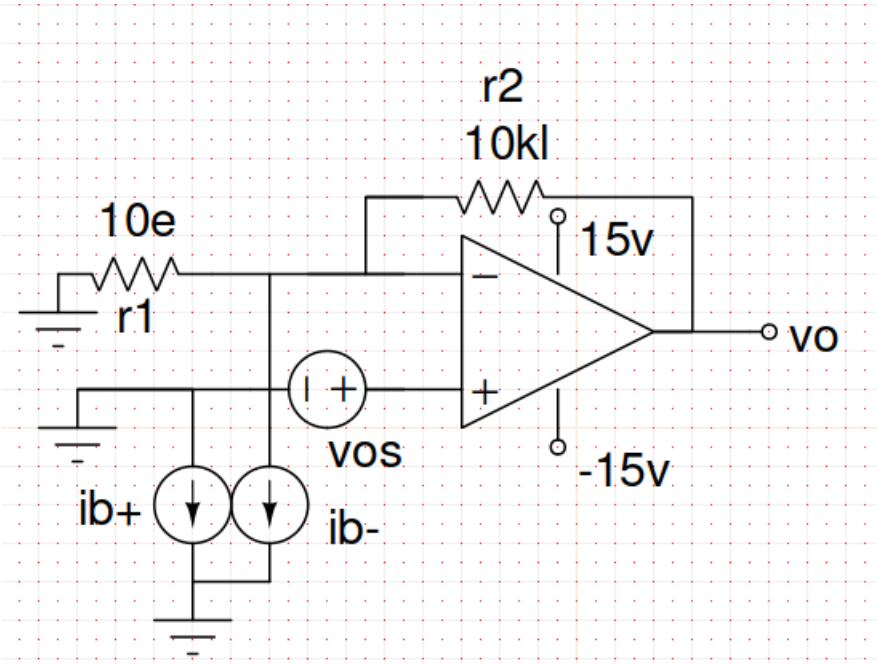

fig2: equivalent circuit

1.2.2 measurement of inverting bias current (I_{B-})

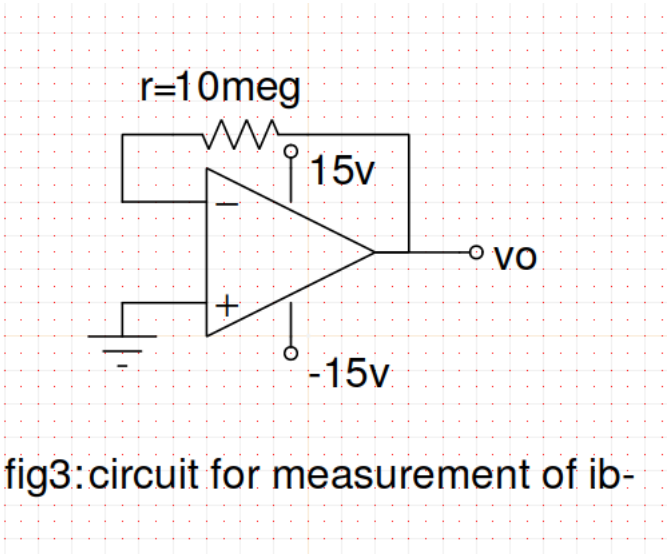

fig3:circuit for measurement of ib-

circuit is connected as shown in figure , now for measurement of I_{B-} we use this formula :
$I_{B-} = V_0/R$
For measurement we have done we got values for V_0 as 3.37v,thus
$I_{B-} = 3.37/10^7 = 337nA$

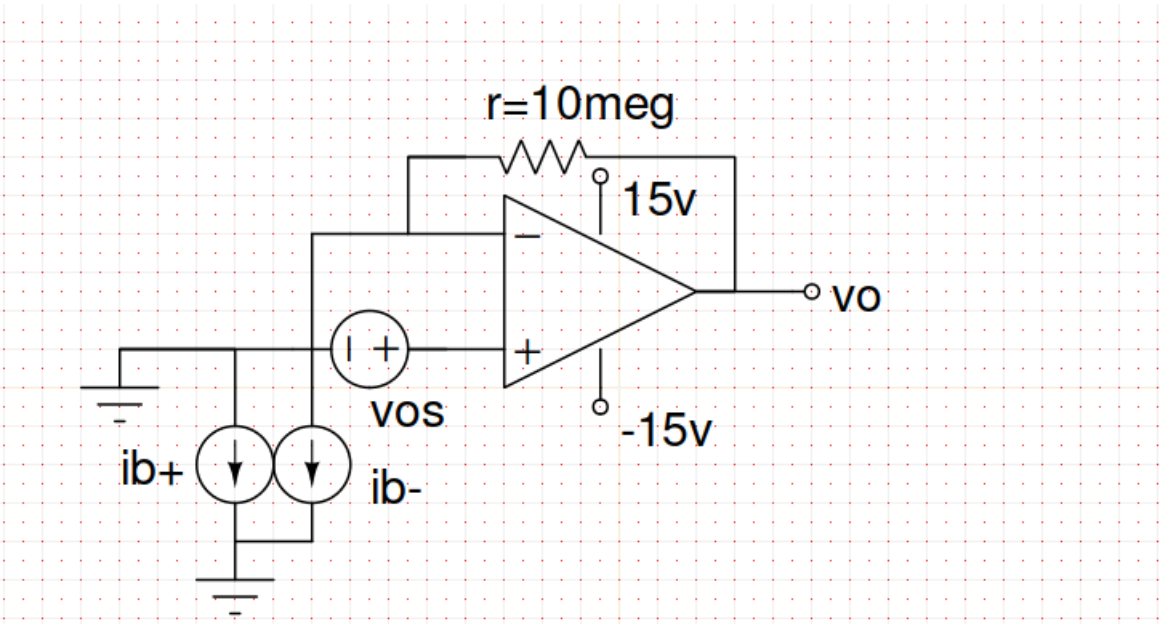

fig4: equivalent circuit for ib- current measurement

1.2.3 measurement of Non-inverting bias current (I_{B+})

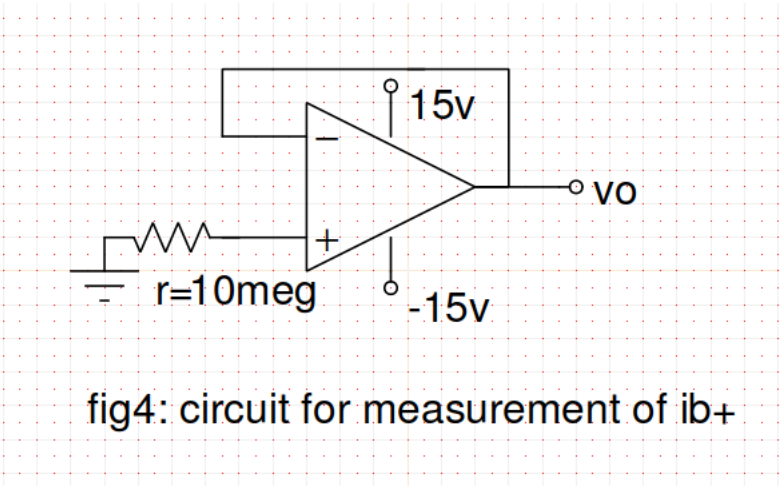

fig4: circuit for measurement of ib+

circuit is connected as shown in figure , now for measurement of I_{B+} we use this formula :
$I_{B+} = V_0/R$
For measurement we have done we got values for V_0 as 3.92v,thus
$I_{B-} = 3.92/10^7 = 392nA$

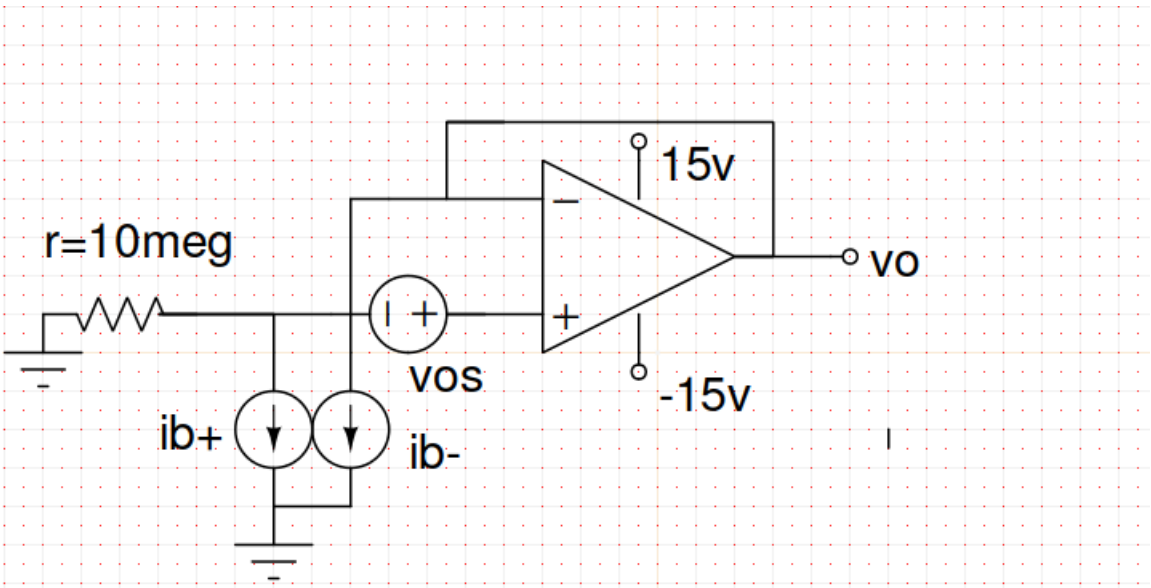

fig5:equivalent circuit for measurement of ib+ current

Typically these values are maximum 800nA as per the dataheet hence,we can conclude that our values match with datasheet.

1.2.4 measurement of Open loop gain (A_{ol})

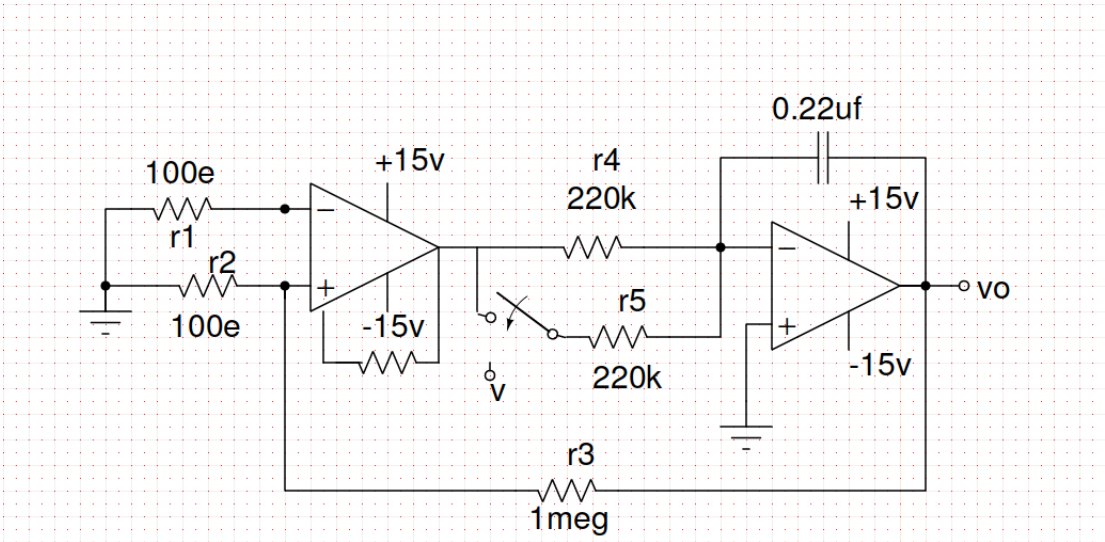

fig8: measurement of dc open loop aol

circuit is connected as shown in figure , now for measurement of A_{ol} we use this formula :
$A_{ol} = -V' * (R_2 + R_3/R_2 * (V_{oB} - VoA))$
V_{oB} and V_{oA} are values obtained when the circuit is in position 1 and 2 respectively.
Values obtained for $V' = 1v$:
$V_{oA} = 0.05v$,$V_{oB} = 0.01v$ which gives us $A_{ol} = 2.5 * 10^5$.
Values obtained for $V' = 2v$:
$V_{oA} = 0.05v$,$V_{oB} = -0.04v$ which gives us $A_{ol} = 2.22 * 10^5$.
Values obtained for $V' = 3v$:
$V_{oA} = 0.05v$,$V_{oB} = -0.1v$ which gives us $A_{ol} = 2 * 10^5$.
Theoretically,$A_{ol} = 2 * 10^5$,hence we can say our values almost match the actual values.

2 Experiment completion status

I have completed all sections in Lab only.