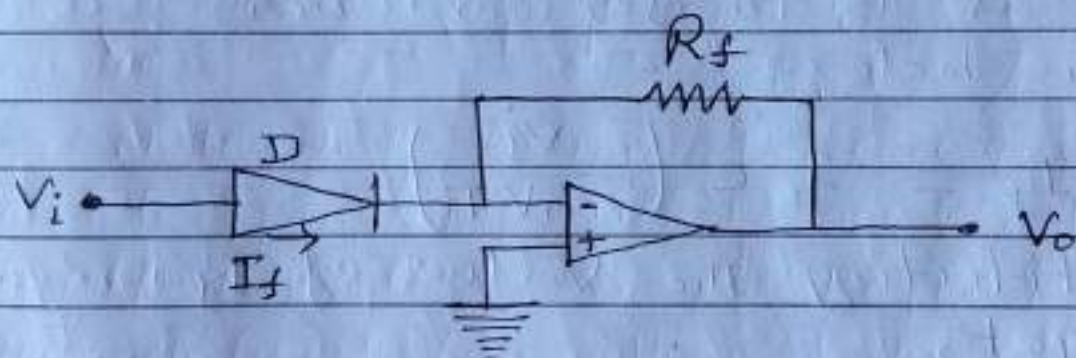




An anti-logarithmic amplifier or an anti-log amplifier is an electronic circuit that produces an output, i.e., proportional to the anti-logarithm of the applied input. This section discusses about the OP-amp-based anti-logarithmic amp. in detail.

An OP-amplifier based anti-logarithmic amplifier produces a voltage at the output, which is proportional to the anti-logarithm of the voltage i.e. applied to the diode connected to its inverting terminal.

The circuit diagram of an OP-amplifier based anti-logarithmic amplifier is shown in the following figure.



In the circuit above, the non-inverting input terminal of the OP-amp. is connected to ground. It means zero volts is applied to its non-inverting input terminal.

According to The Virtual Short Concept The Voltage at The inverting input terminal of OP- amplifiers will be equal to The Voltage Present at its non- inverting input terminal. So, The Voltage at its inverting input terminal will be Zero Volts.

The Nodal equation at The inverting input terminal node is

$$-I_f + \frac{0 - V_o}{R_f} = 0$$

$$\Rightarrow -\frac{V_o}{R_f} = I_f$$

$$\Rightarrow V_o = -R_f I_f \quad \text{--- (1)}$$

we know That the equation for The Current flowing through a diode, when it is in forward bias, is as given below —

$$I_f = I_s e^{\left(\frac{V_f}{nVT}\right)}$$

Substituting the Value of I_f in equⁿ (1) we get,

$$V_o = -R_f \left\{ I_s e^{\left(V_f/nVT\right)} \right\}$$

$$V_o = -R_f I_s e^{\left(V_f/nVT\right)} \quad \text{--- (2)}$$

The KVL equation at The input side of The inverting terminal of The OP- amplifier will be

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$$V_i - V_f = 0$$

$$V_f = V_i$$

Substituting, The Value of in The equation we get

$$V_o = -R_f I_s e^{(V_i / nV_T)}$$

Note That in The above equⁿ The Parameters n , V_T and I_s are Constants. So, The output Voltage V_o will be Proportional to The anti-natural logarithm (exponential) of The input Voltage V_i for a fixed Value of feedback resistance R_f .

Therefore, The OP-amplifier based anti-logarithmic amplifier Circuit discussed above will produce an output, which is Proportional to The anti-natural (exponential) of The input Voltage V_i , when $R_f I_s = 1V$.

observe That the output Voltage V_o is having a -ve sign. which indicates That there exists a 180° Phase difference between The input and The output.