

CIE A-Level Physics

21 - Electronics

Flashcards

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What is an operational amplifier?



What is an operational amplifier?

An integrated circuit amplifier used as a system block in electronic systems to amplify voltages.



What is an ideal op-amp?



What is an ideal op-amp?

An ideal op-amp has an infinite open loop gain A_{OL} and infinite input resistance.



What are the two input terminals of an op-amp?



What are the two input terminals of an op-amp?

Non-inverting input and inverting input.



State one use of an op-amp.



State one use of an op-amp.

It can be used to compare two voltages.
When they are equal, the output is 0.



How can the gain of an operational amplifier be controlled?



How can the gain of an operational amplifier be controlled?

By negative feedback; if some of the output voltage is fed back to the inverting input then the voltage gain can be altered to a lower value.



How does the inverting amplifier make use of negative feedback?



How does the inverting amplifier make use of negative feedback?

It amplifies signals by a factor equal to the ratio of the feedback resistance to the resistance of the input resistor at the inverting input, the output is inverted:

$$A_{CL} = V_{out} / V_{in} = -R_f / R_{in}$$



State one use of operational amplifiers.



State one use of operational amplifiers.

They can be configured to add two or more voltages or to subtract one voltage from another.



What is meant by virtual earth and virtual earth analysis?



What is meant by virtual earth and virtual earth analysis?

The input to the inverting input is a virtual earth as, although it isn't connected directly to 0V (earth), its value is very close. Virtual earth analysis is using a virtual earth (steady reference potential without being connected to a reference potential) to analyse a circuit.



What is a relay?



What is a relay?

A relay is an electromagnetically operated switch.

For a normal closed relay, when a coil is not energized the switch is closed. This completes the circuit. For a normally open relay, if it is energized the switch is closed, once again completing the circuit.

