

A guide to internal resistance in series circuits

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Internal Resistance in Series Circuits

What is Internal Resistance in Series?

Internal resistance is the resistance within a cell or battery that opposes the flow of current. When cells are connected in series, their internal resistances add up.

What Happens to Internal Resistance in Series?

In a series circuit, the total internal resistance increases as more cells are added. This is because the resistances add up.

What Happens to Potential Differences in Series?

In a series circuit, the potential difference across the load remains the same, but the potential difference across each cell decreases as the number of cells increases. This is because the internal resistance increases.

How Does Resistance Behave in Series?

In a series circuit, the total resistance is the sum of the individual resistors. This means that the resistance increases as more resistors are added.

When to Use \mathcal{E} and $\mathcal{E} - \mathcal{E}_{\text{int}}$

- \mathcal{E} is used to represent the potential difference across the internal resistance of a cell.

- e is used to represent the potential difference across the load.

How to Calculate the Total Resistance in a Series Circuit

The total resistance in a series circuit is the sum of the individual resistances. The formula is:

$$R_{\text{total}} = R_1 + R_2 + \dots + R_n$$

where R_1, R_2, \dots, R_n are the individual resistances.

Rule of Internal Resistance

The rule of internal resistance states that the total internal resistance in a series circuit is the sum of the internal resistances of the individual cells.

How to Calculate Internal Resistance

Internal resistance can be calculated using Ohm's law:

$$V = IR$$

where:

- V is the potential difference across the cell
- I is the current flowing through the cell
- R is the internal resistance

What is Internal Series Resistance?

Internal series resistance is the resistance within a cell or battery that opposes the flow of current in a series circuit.

Total Resistance in Series and Parallel

- In a series circuit, the total resistance is the sum of the individual resistances.
- In a parallel circuit, the total resistance is less than the smallest individual resistance.

Formula for Total Internal Resistance

The formula for total internal resistance in a series circuit is:

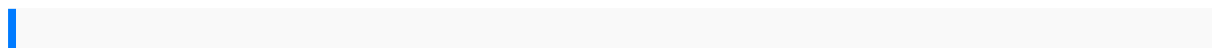
$$R_{\text{int_total}} = R_{\text{int_1}} + R_{\text{int_2}} + \dots + R_{\text{int_n}}$$

where $R_{\text{int_1}}$, $R_{\text{int_2}}$, ..., $R_{\text{int_n}}$ are the internal resistances of the individual cells.

Internal Resistance of Two Cells in Series

The internal resistance of two cells in series is the sum of their individual internal resistances. The formula is:

$$R_{\text{int_total}} = R_{\text{int_1}} + R_{\text{int_2}}$$



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