# Dependent Sources: VCVS,VCCS,CCVS,CCCS

Elementrix Classes

Dependent Sources

Dependent sources are electronic circuit elements whose output (voltage or current) is dependent on an independent variable in the circuit, such as voltage or current. These sources are often used in circuit analysis and design. There are two main types of dependent sources: voltage-controlled and current-controlled.
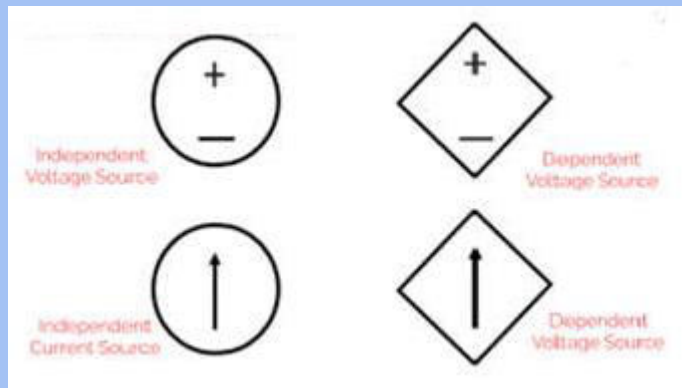
1. **Voltage-Controlled Voltage Source (VCVS):**

   In a VCVS, the output voltage is proportional to a controlling voltage elsewhere in the circuit.

   The relationship is typically expressed as $V_{out} = \mu \cdot V_{in}$, where μ is the voltage gain.

1. **Voltage-Controlled Current Source (VCCS):**

   In a VCCS the output current is proportional to a controlling voltage in the circuit.

   The relationship is typically expressed as $I_{out} = G \cdot V_{in}$, where **G** is the transconductance **(ratio of the change in output current to the change in input voltage)**.

3. Current-Controlled Voltage Source (CCVS):

In a CCVS the output voltage is proportional to a controlling current in the circuit.

The relationship is expressed as $V_{out} = R \cdot I_{in}$, where **R** is the transresistance **(ratio of the change in output voltage to the change in input current)**.

4. Current-Controlled Current Source (CCCS):

In a CCCS, the output current is proportional to a controlling current elsewhere in the circuit.

The relationship is expressed as $I_{out} = \beta \cdot I_{in}$, where **β** is the current gain.

पढ़िए और पढ़ाइये

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