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Current in bridge circuit



Overview

Basics of Bridge Circuits | Basic Direct Current (DC) Theory | TextbookComponent MeasurementSensor Signal ConditioningTemperature Compensation in A Wheatst.

Key Takeaways

The current in a bridge circuit depends on the resistor ratios and the applied voltage, and it can be calculated using Kirchhoff's laws or voltage divider principles.Understanding Bridge Circuit Currents

A bridge circuit, such as the Wheatstone bridge, consists of four resistors arranged in a diamond shape with a voltage source applied across two opposite corners and a bridge branch connecting the other two corners . The current through each branch is determined by the resistances and the applied voltage.

• Balanced Bridge: When the ratio of resistances satisfies R1/R2=R3/Rx, the bridge is balanced, and the current through the bridge branch is zero. The voltage across the bridge branch is also zero, regardless of the excitation voltage .

• Unbalanced Bridge: If the ratios are not equal, a potential difference develops across the bridge branch, causing a current to flow. The magnitude of this current depends on the excitation voltage and the relative resistances of the arms .
Calculating Currents
• Using Kirchhoff's Laws:
• Assign currents to each branch (e.g., I1,I2,I3) and apply Kirchhoff's Current Law (KCL) at junctions to relate branch currents.

• Apply Kirchhoff's Voltage Law (KVL) around independent loops to form equations.

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• Solve the simultaneous equations to find the current in each branch, including the bridge branch .

• Using Voltage Divider and Ohm's Law:
• Determine the voltage at the nodes connected by the bridge branch using the voltage divider formula.

• The current through the bridge branch is then Ibridge=Vab/Rbridge, where Vab is the voltage difference between the nodes and Rbridge is the resistance of the bridge branch .

Practical Notes
• The excitation voltage affects the magnitude of currents but does not change the balance condition.

• In AC bridge circuits, the same principles apply, but impedances replace resistances, and phasor analysis may be required.

• Bridge circuits are widely used in sensors and measurement systems, where the bridge current indicates changes in a sensing element, such as a strain gauge . By understanding the resistor ratios and applying Kirchhoff's laws or voltage dividers, the current in any branch of a bridge circuit can be accurately determined.

Article Content

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Bridge Circuits | DC Metering Circuits | Electronics

There are many variations of the basic Wheatstone bridge circuit. Most DC bridges are used to measure

AC Bridge Circuits | AC Metering Circuits | Electronics

This ingenious bridge circuit is known as the Maxwell-Wien bridge (sometimes known plainly as the

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The bridge differential output AC signal is converted to a current by A1, operating as a Howland current pump. This current, whose

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Diode bridge

A diode bridge is a bridge rectifier circuit of four diodes that is used in the process of converting alternating

Wheatstone Bridge Circuit and Theory of Operation

The Wheatstone Bridge circuit is nothing more than two simple series-parallel arrangements of resistances

Nondestructive Evaluation Techniques : Eddy Current Testing

The bridge circuit shown in the applet below is known as the Maxwell-Wien bridge (often called the Maxwell bridge), and is used to

Current Sensing in an H-Bridge (Rev. D)

Bidirectional current sensing in a full H-bridge motor control is critical for safety and reliability to monitor and control a system. An

SECTION 2 BRIDGE CIRCUITS

The bottom of the bridge is driven by an op amp, which maintains a constant current in the varying resistance element. The output

8.10: Bridge Circuits

Review Bridge circuits rely on sensitive null-voltage meters to compare two voltages for equality. A Wheatstone bridge can be used

Different Types of Bridge Circuits and Its Functions

A bridge circuit is used to measure the impedances like resistors, capacitors & inductors and also altering signals from transducers

Bridge Circuit: H-Bridge & Rectifier Fundamentals

Bridge Circuit Dive into the intricate world of Physics as you explore the fundamental components, operations, and

an117: Basic Bridge Circuits

The following examples focus only on Figure 1 type bridge circuit topologies with a single resistive variable element. Output

Wheatstone Bridge Circuit Equations and Derivation

Wheatstone Bridge Circuit Operation Wheatstone Bridge Analysis and Calculator The illustration below shows a basic bridge circuit

Bridge Circuit Equivalent Resistance

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Physics Ninja looks how to find the current in each branch of a bridge circuit and also

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Current Sensing in an H-Bridge Arjun Prakash and Mubina Toa The semiconductor industry has always looked for improvements in

Basic Bridge Circuits

Understanding the fundamentals of bridge circuits empowers engineers and technicians to implement accurate and reliable systems

Bridge Circuits and Its Types

A bridge circuit is a topology of electrical circuitry in which two circuit branches (usually in parallel with each other) are

E12c: Kirchhoff''s Rules and Bridge Circuits

A bridge circuit is a circuit in which the current splits into two parallel paths only to recombine into a single current elsewhere in the

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Diode bridge

Diode bridge ... A hand-made diode bridge. The silver band on the diodes indicates the cathode side of the

What are AC Bridges? Definition, basic circuit and balance equation ...

The detector current I d should be zero. The potential difference between the detector node should be zero. Now, the question arises

Full Bridge Rectifier: Working, Circuit Diagram, and Applications

Learn how a full bridge rectifier works, its circuit diagram, formulas, efficiency, and real-world applications in AC-to-DC

What are Bridge Circuits: the basics » Electronics Notes

Bridge Circuits: the basics From Wheatstone bridges to bridge rectifiers, bridge circuits are a circuit format where two circuit

Bridge rectifier

Bridge rectifier A bridge rectifier is an electrical circuit that converts alternating current (AC) into direct current (DC). It is classified as

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What Is a Bridge Circuit and How Does It Work?

The most recognizable direct current (DC) bridge circuit is the Wheatstone configuration, popularized by Sir Charles

Bridge Circuit Construction

Figure 1 shows a basic bridge circuit which consists of three known resistances, R1, R2, and R3 (variable), an

Bridge Rectifier

Conclusion To summarize the bridge rectifier plays a role, in electronics by converting alternating current (AC) into

Voltage/Current Dividers with Wheatstone Bridge | CircuitBread

From Wheatstone Bridges to Voltage and Current Dividers, learn how these components serve as building blocks for

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Multiple resistors in a series circuit are subjected to the same current. On this page we discuss an the Wheatstone

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Bridge circuits are among the most elemental and powerful electrical tools.

Construction

Construction The construction of a bridge rectifier is shown in the figure below. The bridge rectifier circuit is made of four diodes D 1,

Diode Bridge: Four Diodes That Convert From AC to DC

A diode bridge rectifier is a simple circuit to convert from AC to DC using four diodes. Learn how it works with our

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