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Disclaimer:

This pathfinder contains suggested materials on electric circuit analysis that are available at the College of Engineering Library II. However, some references were not included.

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ELECTRIC CIRCUIT ANALYSIS

PATHFINDER





Circuit analysis

- A troubleshooting method used when a relay fails to turn the load on or off, or operates erratically. Circuit analysis is used when the relay is not suspected as the primary cause of malfunction.

Source : <http://www.toolingu.com/definition-460375-35002-circuit-analysis.html>

Electrical network

- Is an interconnection of electrical elements such as resistors, inductors, capacitors, transmission lines, voltage sources, current sources and switches.

Electrical circuit

- Is a network that has a closed loop, giving a return path for the current. A network is a connection of two or more components and may not necessarily be a circuit.
- Electrical networks that consist only of sources (voltage or current), linear lumped elements (resistors, capacitors, inductors) and linear distributed elements (transmission lines) can be analyzed by algebraic and transform methods to determine DC response, AC response and transient response.
- A network that also contains active electronic components is known as an electronic circuit. Such networks are generally nonlinear and require more complex design and analysis tools.

Design methods

- To design any electrical circuit, either analog or digital, electrical engineers need to be able to predict the voltages and currents at all places within the circuit. Linear circuits, that is, circuits with the same input and output frequency, can be analyzed by hand using complex number theory. Other circuits can only be analyzed with specialized software programs or estimation techniques.

Electrical laws

A number of electrical laws apply to all electrical networks. These include:

- Kirchhoff's current law : The sum of all currents entering a node is equal to the sum of all currents leaving the node.
- Kirchhoff's voltage law : The directed sum of the electrical potential differences around a loop must be zero.
- Ohm's law - The voltage across a resistor is equal to the product of the resistance and the current flowing through it (at constant temperature)
- Norton's theorem - any network of voltage and/or current sources and resistors is electrically equivalent to an ideal current source in parallel with a single resistor.
- Thevenin's theorem - any network of voltage and/or current sources and resistors is electrically equivalent to a single voltage source in series with a single resistor.

Source: http://en.wikipedia.org/wiki/Electrical_network



Image URL: <http://www.quasarelectronics.com/images/electronic-kit/3003.jpg>

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