

Ohm's Law $V = I R$ Volts

Joule's Law $P = V I = I^2 R$ Watts

Kirchoff's Law

Sum of the Loop Voltages = 0

Sum of the Node Currents = 0

Calculate Series & Parallel Equivalent Resistance

Sketch Series Resistors Voltage Divider (including voltage source)

Calculate voltage across load resistor

Voltage Divider (Resistors in Series with Voltage Source) $V_2 = V (R_2 / (R_1 + R_2))$

Sketch Parallel Resistors Current Divider (including current source)

Calculate current through load resistor

Current Divider (Resistors in Parallel with Current Source) $I_2 = I (R_1 / (R_1 + R_2))$

Sketch Thevenin & Norton Equivalent Circuits

Describe how to calculate Equivalent Voltage, Current, Resistance from measurements

Thevenin's Theorem and Equivalent Circuit Series voltage source $\{V_{eq}\}$ and resistor equivalent $\{R_{eq}\}$

Any network of resistors and sources having two output terminals,

may be replaced by a series combination of a voltage source V_{eq} and a resistance R_{eq} .

The equivalent emf V_{eq} is the potential at the output terminals when the output current is zero;

i.e., the open-circuit voltage.

The equivalent resistance R_{eq} is the ratio of the V_{eq} to the output current when R_{Load} is zero;

i.e., the short-circuit current.

Norton's Theorem and Equivalent Circuit Parallel Current source $\{I_{eq}\}$ and resistor equivalent $\{R_{eq}\}$

Any network of resistors and sources having two output terminals,

may be replaced by a parallel combination of a current source I_{eq} and a resistance R_{eq} .

The current source I_{eq} is the short-circuit current in the output terminals,

and the resistance R_{eq} is the same as for Thevenin's Theorem.

Course Handouts:

Serial & Parallel Resistors Example

Simple Voltage & Current Dividers

Thevenin & Norton Equivalent Circuits

<http://hyperphysics.phy-astr.gsu.edu/hbase/electric/thevenin.html>

Electrical Concepts