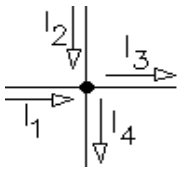
ECE 2210 / 00
Exam 1 Information

Useful Information

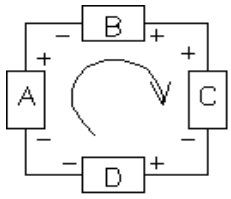
KCL, **K**irchhoff's **C**urrent **L**aw

$I_{in} = I_{out}$ of any point, part, or section



KVL, **K**irchhoff's **V**oltage **L**aw

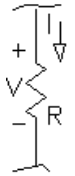
$V_{gains} = V_{drops}$ around any loop



Node = all points connected by wire, all at same voltage (potential)

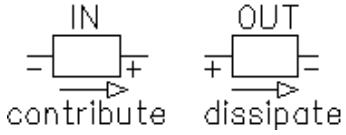
Ohm's law (resistors)

$V = I \cdot R$



$I = \frac{V}{R}$ $\quad R = \frac{V}{I}$

Power $P_{IN} = P_{OUT}$ for resistor circuits



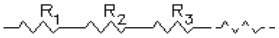
$P = V \cdot I$ for everything

$= I^2 \cdot R = \frac{V^2}{R}$ for resistors

Maximum power transfer: $R_L = R_{Th}$

Load = Thevenin's

Resistors



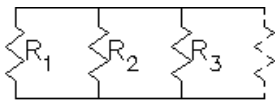
series: $R_{eq} = R_1 + R_2 + R_3 + \ldots$

Exactly the **same current** through each resistor

Voltage divider:

$V_{Rn} = V_{total} \cdot \frac{R_n}{R_1 + R_2 + R_3 + \ldots}$

parallel: $R_{eq} = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots}$



Exactly the **same voltage** across each resistor

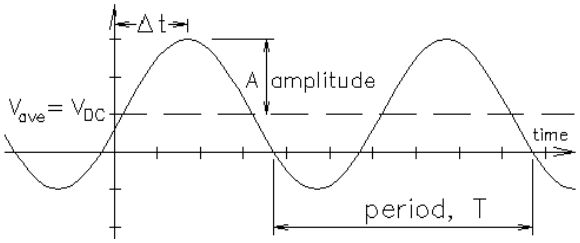
current divider:

$I_{Rn} = I_{total} \cdot \frac{\frac{1}{R_n}}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots}$

Superposition and Thevenin

To zero out a source: Voltage source => short Current source => open

Basic AC



$f = \frac{1}{T} = \frac{\omega}{2 \cdot \pi}$

$\omega = 2 \cdot \pi \cdot f$ $\quad \phi = -\frac{\Delta t}{T} \cdot 360 \cdot \text{deg}$

$v(t) = V_p \cdot \cos(\omega \cdot t + \phi)$

current is similar

Capacitors

parallel: $C_{eq} = C_1 + C_2 + C_3 + \ldots$

series: $C_{eq} = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}}$

$W_C = \frac{1}{2} \cdot C \cdot V_C^2$