SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

23EET101 / BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

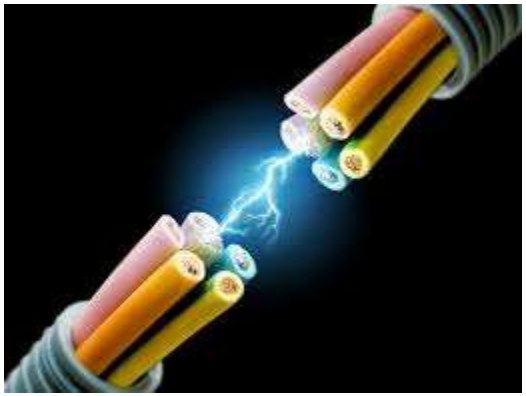
I YEAR / I SEMESTER

UNIT-I: ELECTRICAL CIRCUITS AND MEASUREMENTS

KIRCHOFFS LAW

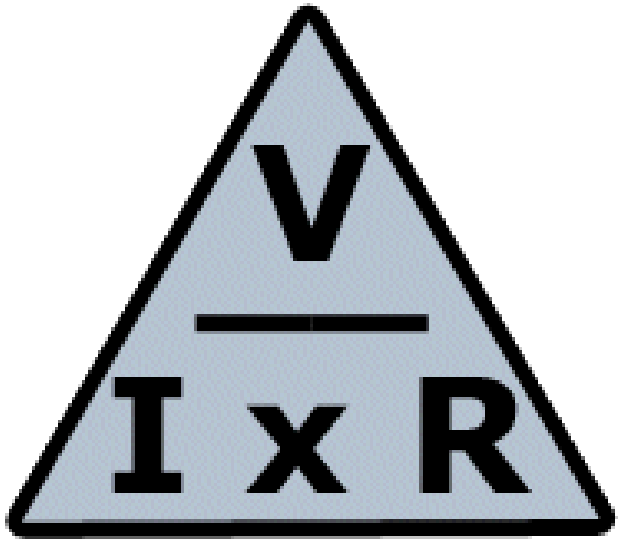
TOPIC OUTLINE

- Kirchoff's Law
  - KCL
  - KVL
- Problems



OHMS LAW - RECAP

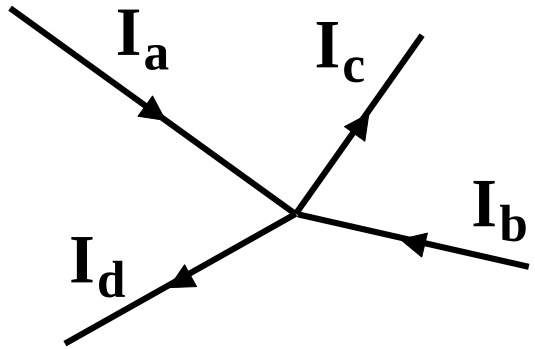
- $V = I \times R$
- $I = \frac{V}{R}$
- $R = \frac{V}{I}$



KCL

- Kirchoff's Current Law (KCL) :

The sum of the current entering a node (junction point) equal to the sum of the currents leaving.



$$I_a + I_b = I_c + I_d$$

I_a, I_b, I_c, and I_d can each be either a positive or negative number.

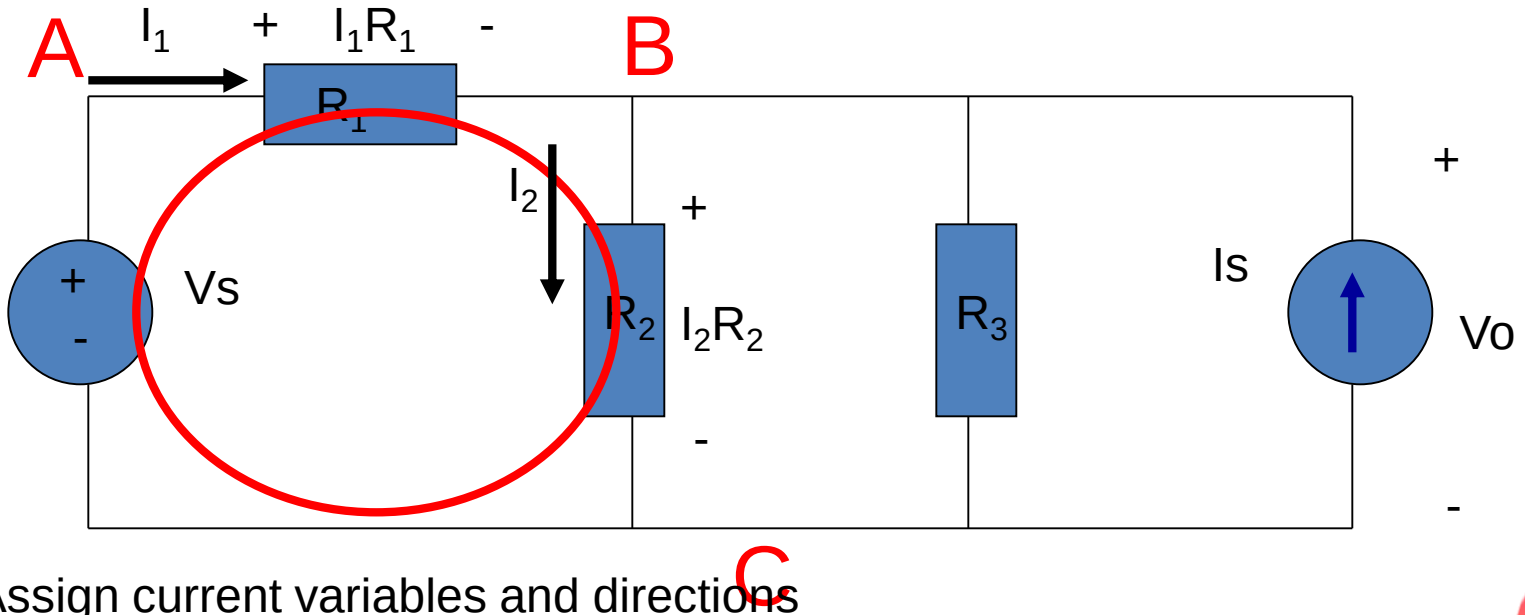
KVL

Kirchoff's Voltage Law (KVL):

- The algebraic sum of voltages around each loop is zero
- Σ voltage drops - Σ voltage rises = 0
- Or Σ voltage drops = Σ voltage rises

EXAMPLE

- Kirchoff's Voltage Law around 1st Loop

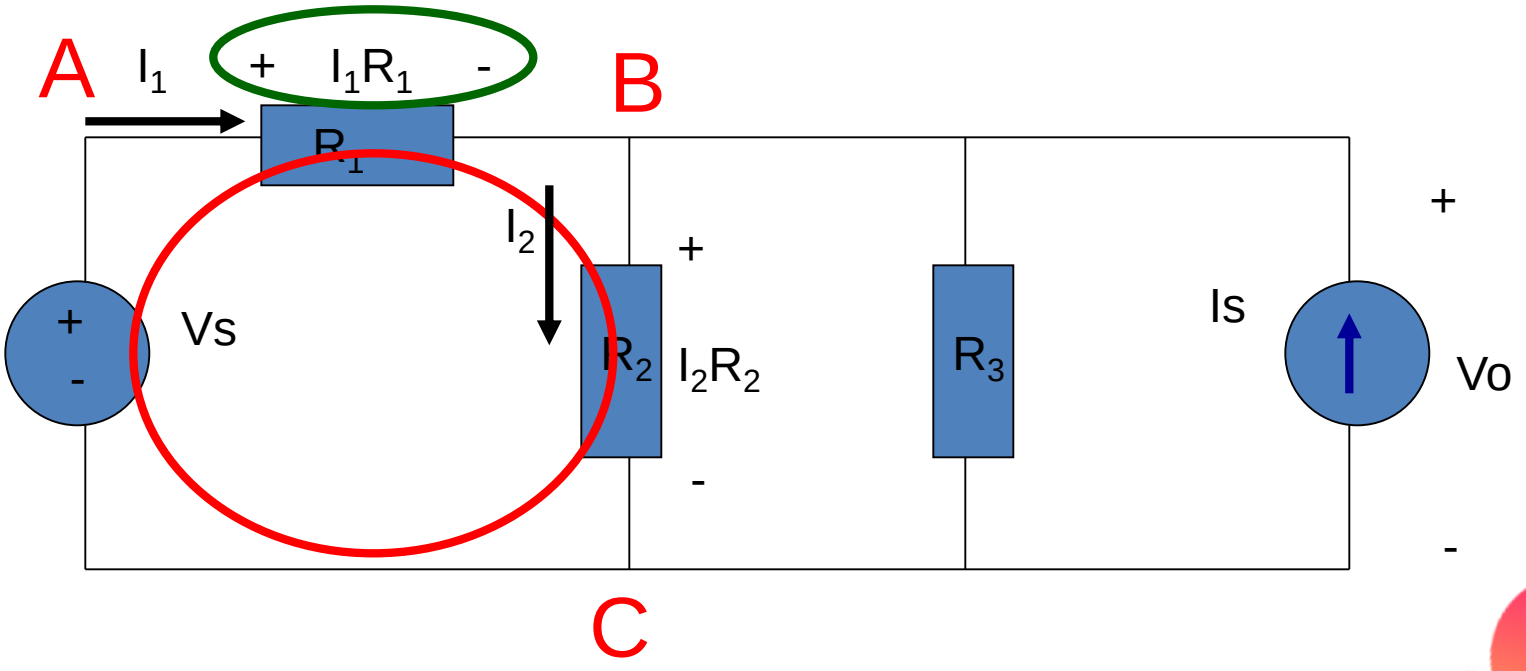


Assign current variables and directions

Use Ohm's law to assign voltages and polarities consistent with passive devices (current enters at the + side)

EXAMPLE

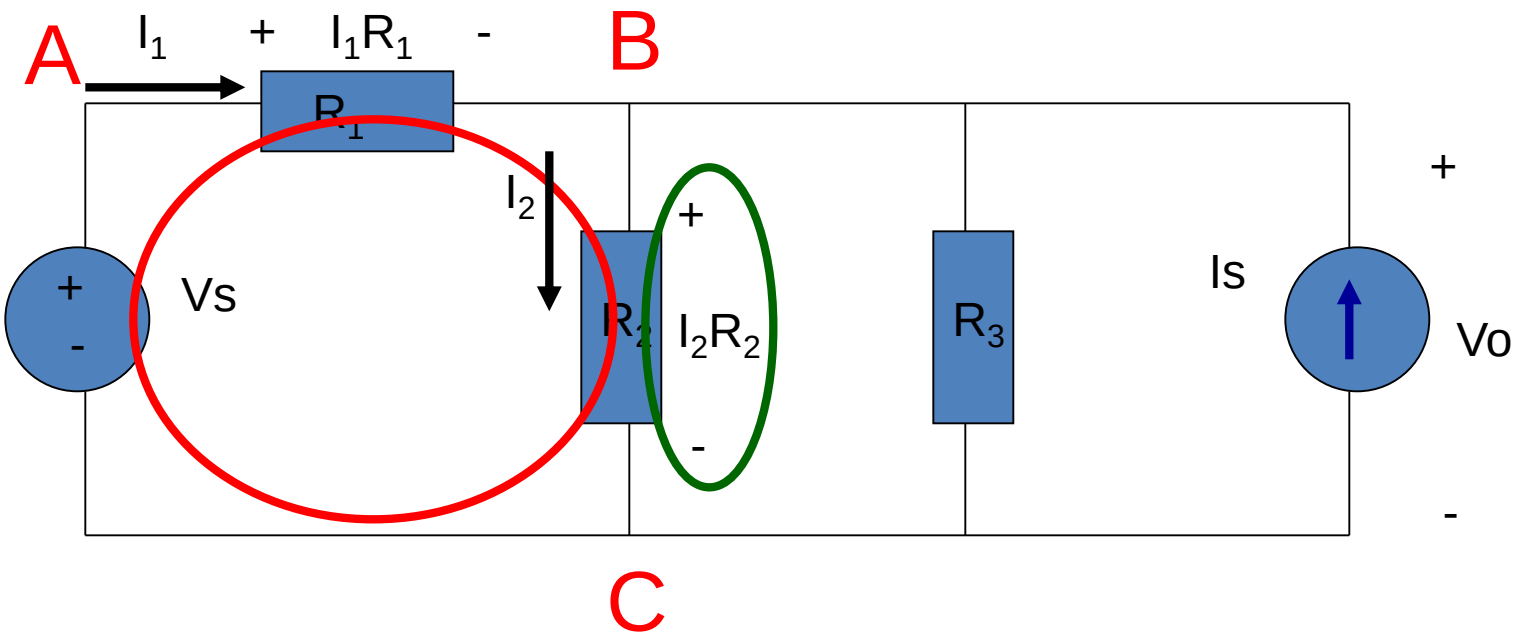
- Kirchoff's Voltage Law around 1st Loop



Starting at node A, add the 1st voltage drop: $+ I_1R_1$

EXAMPLE

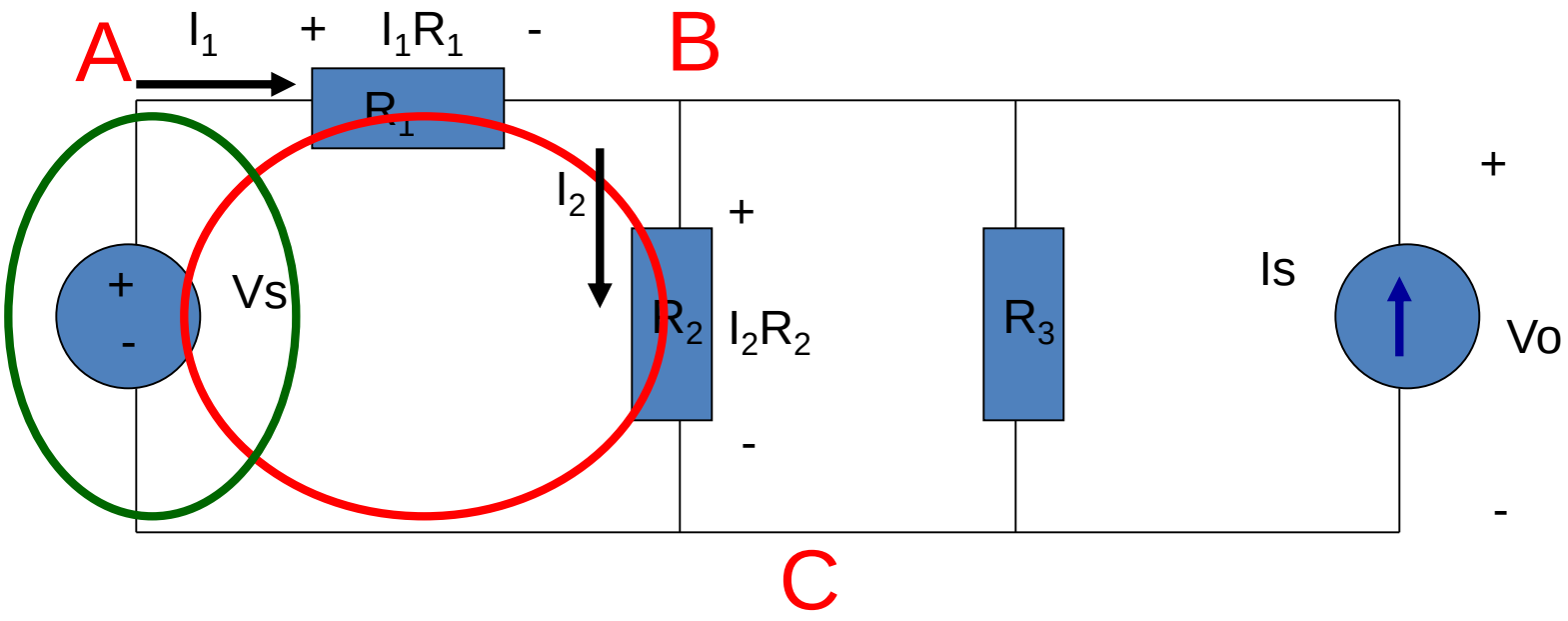
- Kirchoff's Voltage Law around 1st Loop



Add the voltage drop from B to C through R_2: $+ I_1R_1 + I_2R_2$

EXAMPLE

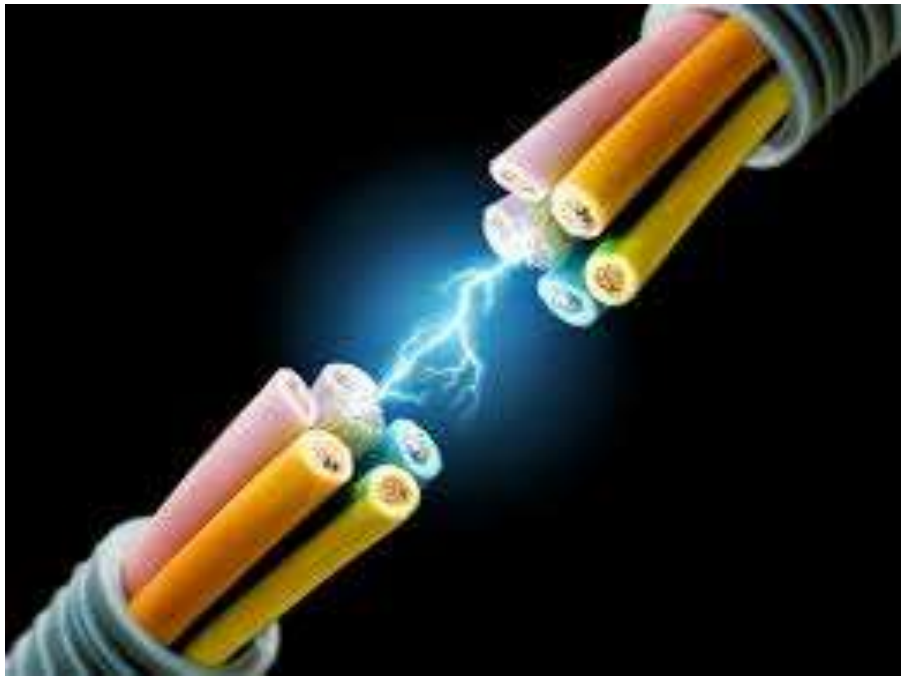
- Kirchoff's Voltage Law around 1st Loop



Subtract the voltage rise from C to A through Vs: $+ I_1R_1 + I_2R_2 - Vs = 0$

Notice that the sign of each term matches the polarity encountered 1st

RECAP….



…THANK YOU