



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

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



19EEB102 / ELECTRIC CIRCUIT ANALYSIS

I YEAR / II SEMESTER

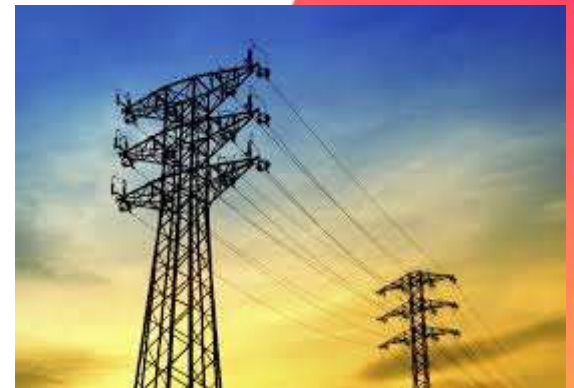
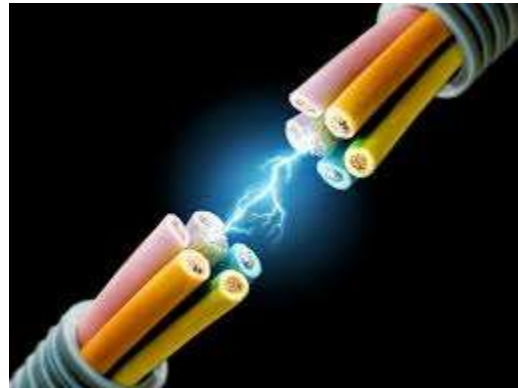
UNIT-I: BASIC CIRCUIT ANALYSIS

KIRCHOFFS LAW



TOPIC OUTLINE

- Kirchoff's Law
 - KCL
 - KVL
- Problems



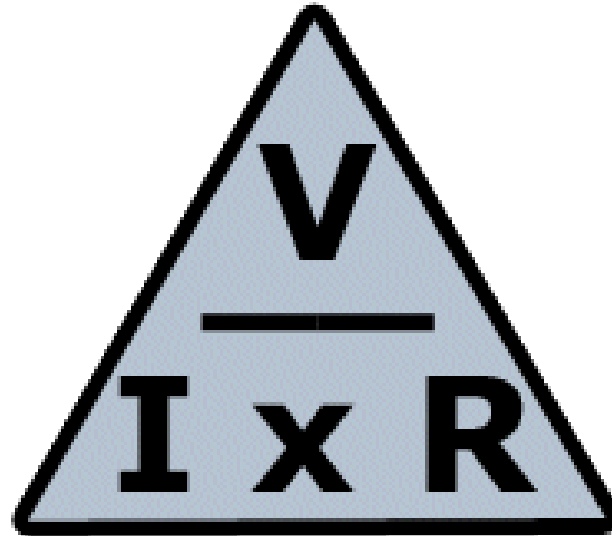


OHMS LAW - RECAP

- $V = I \times R$

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

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

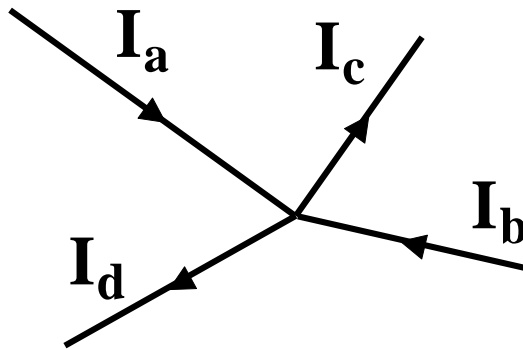




KCL

- Kirchoff's **C**urrent **L**aw (**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

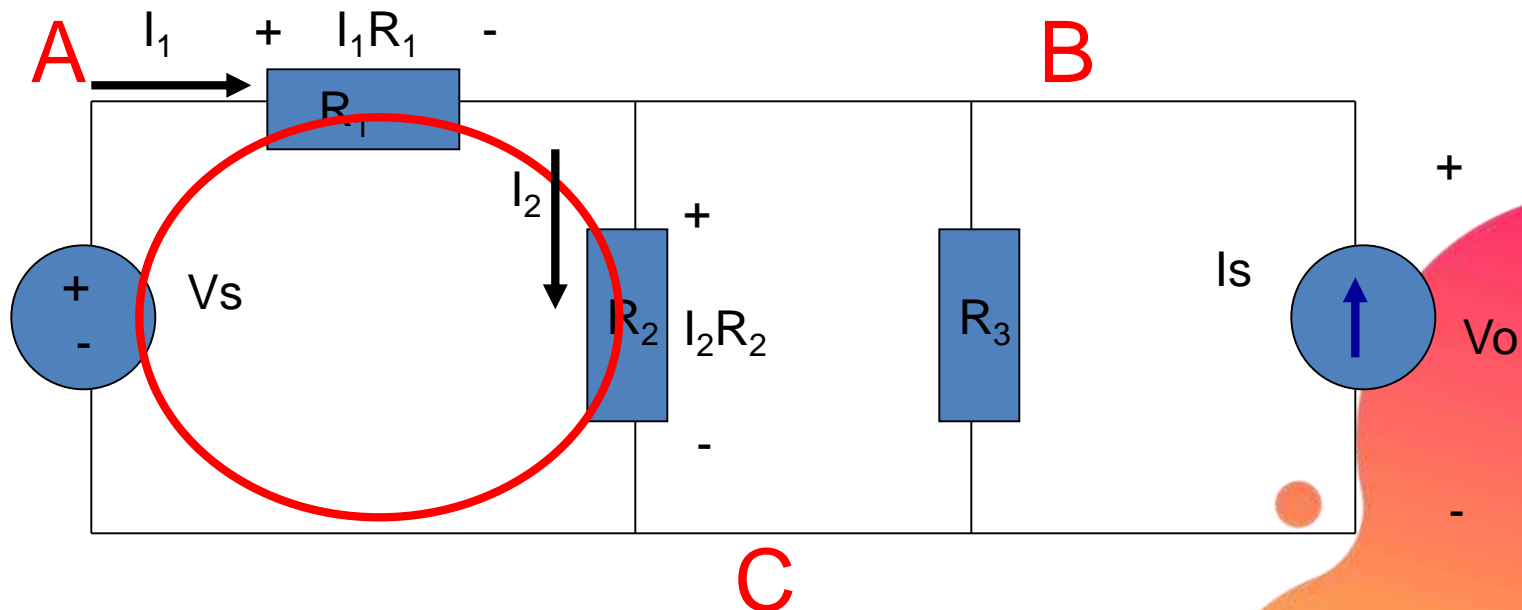
Kirchoff's Voltage Law (KVL):

- 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



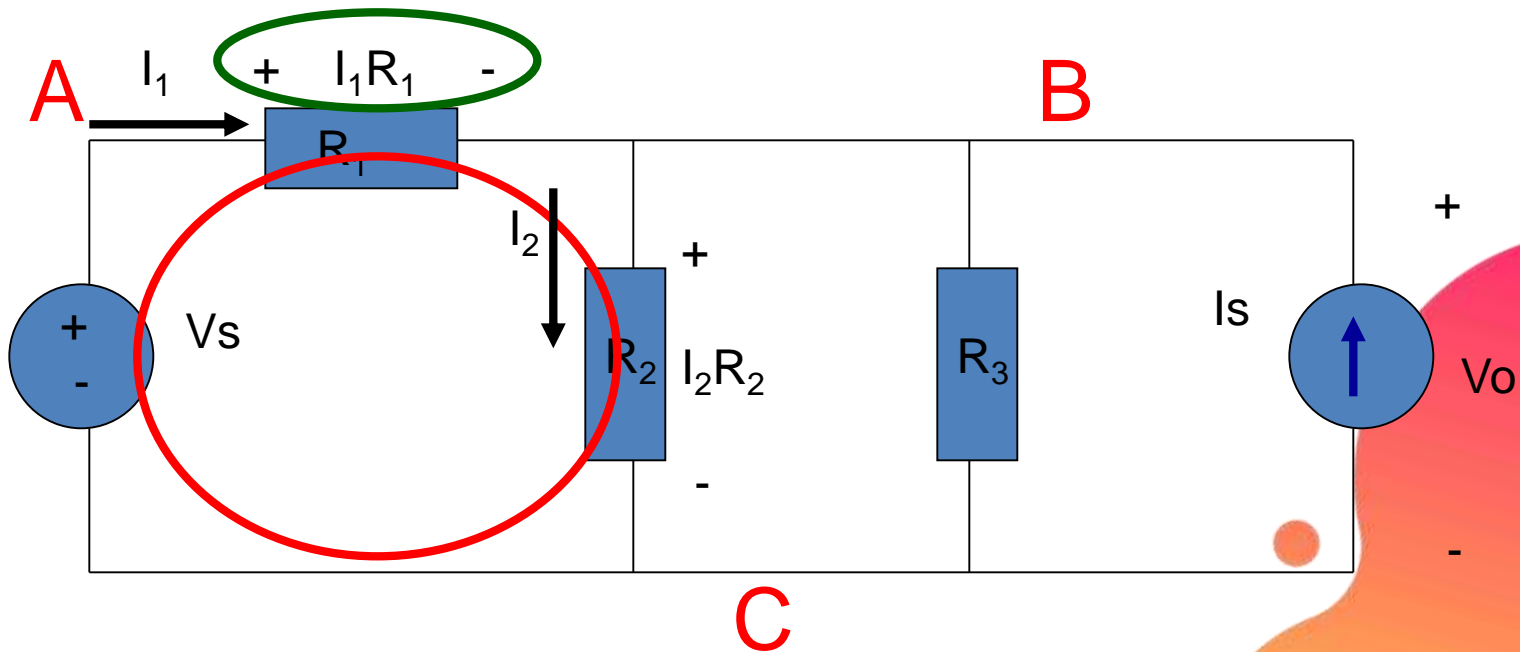
Assign current variables and directions

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

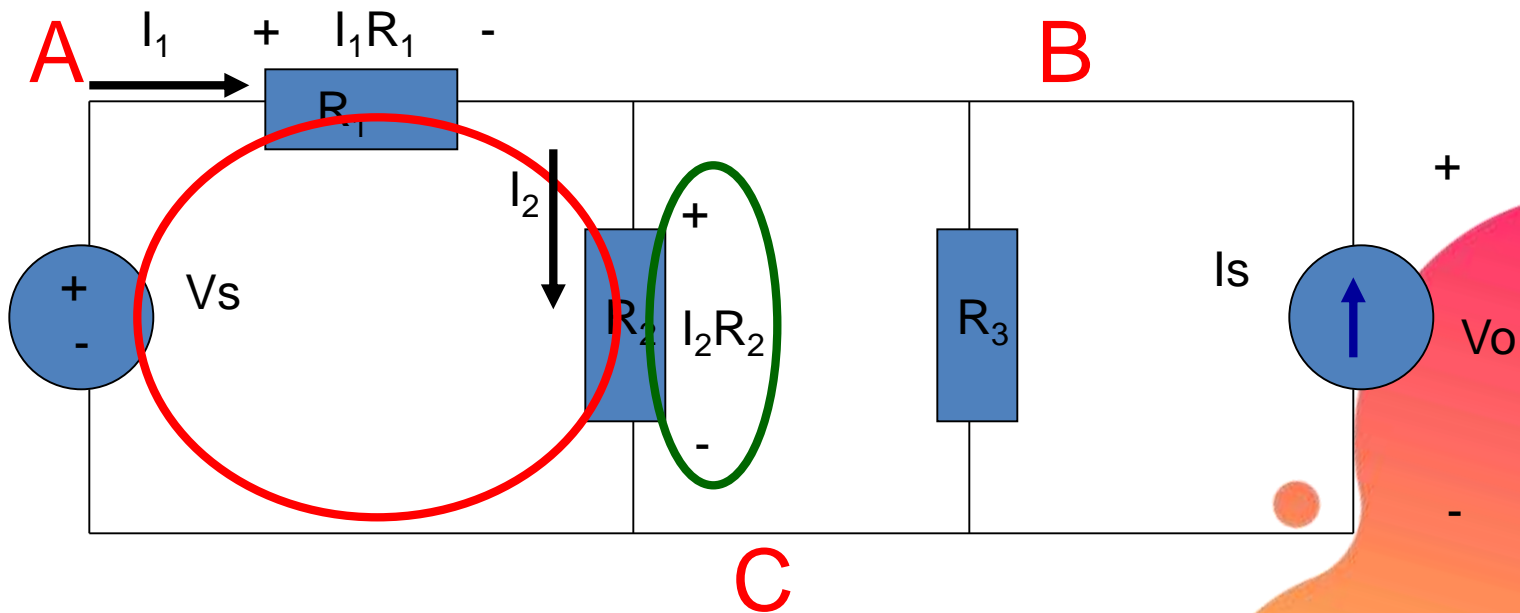


Starting at node A, add the 1st voltage drop: $+ I_1 R_1$



EXAMPLE

- Kirchoff's Voltage Law around 1st Loop

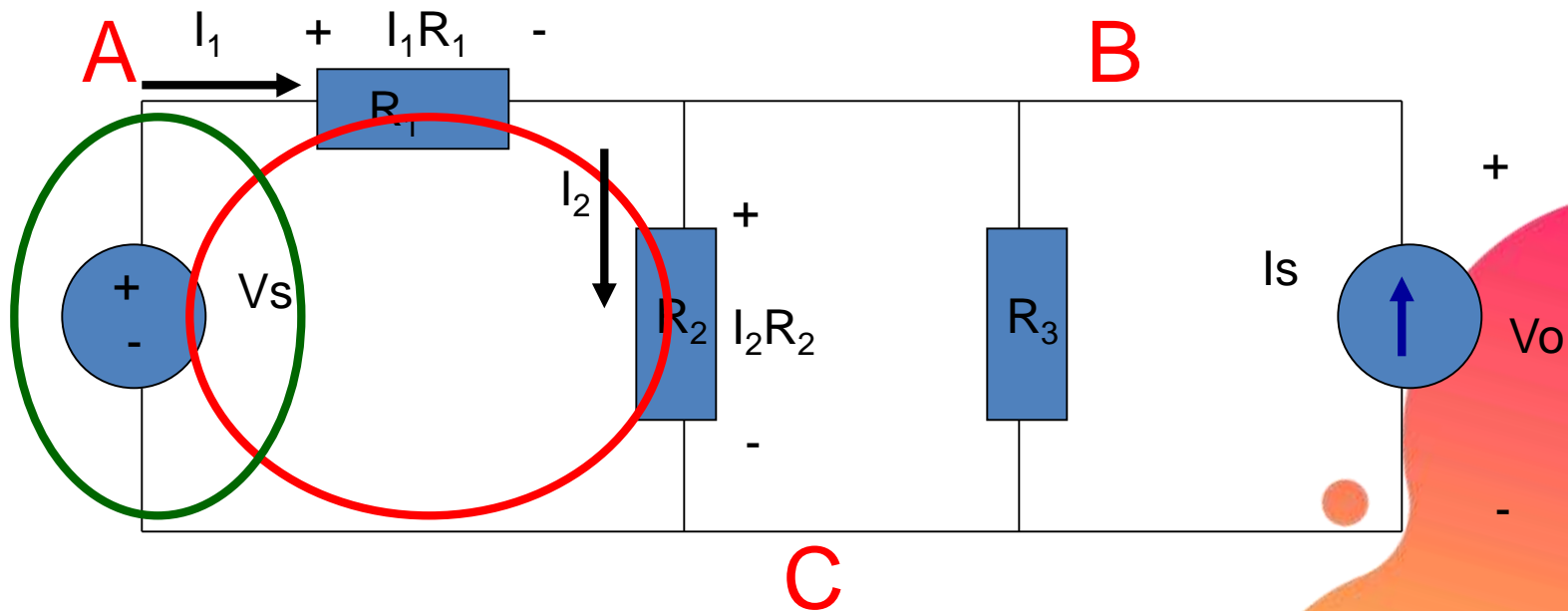


Add the voltage drop from B to C through R_2 : $+ I_1 R_1 + I_2 R_2$



EXAMPLE

- Kirchoff's Voltage Law around 1st Loop

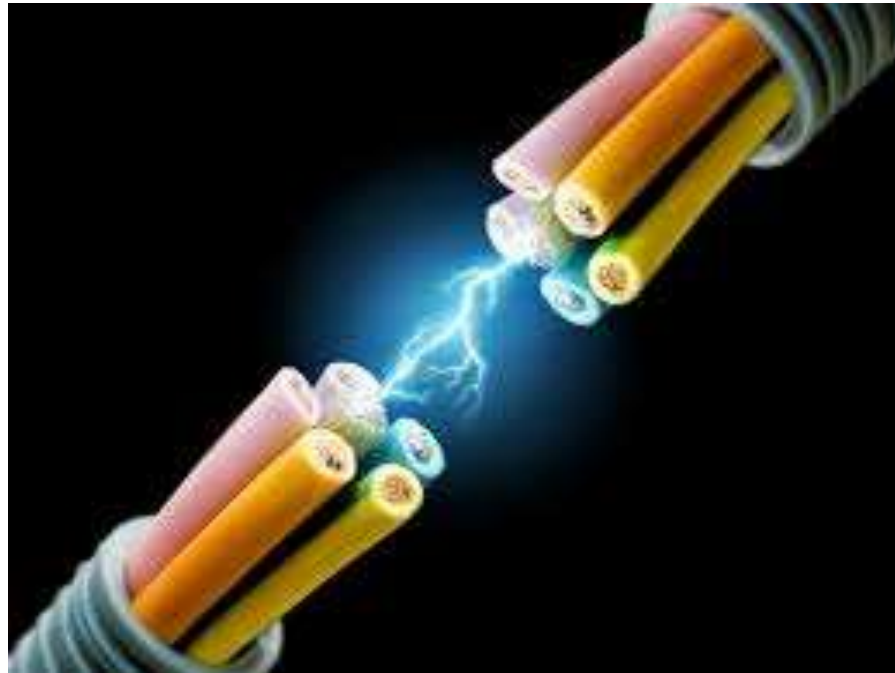


Subtract the voltage rise from C to A through V_s : $+ I_1 R_1 + I_2 R_2 - V_s = 0$

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



RECAP...



...THANK YOU