

SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

Accredited by NBA-AICTE and Accredited by NAAC – UGC with A+ Grade

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



19EET101 / BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING

I YEAR / I SEMESTER

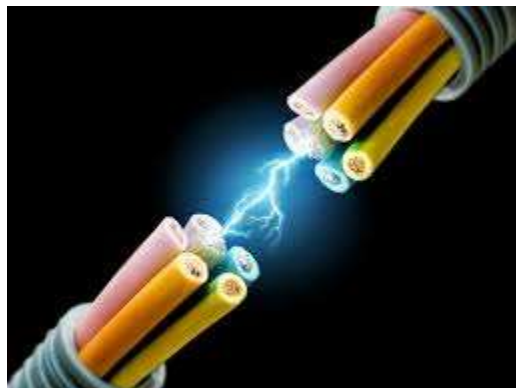
UNIT-I: ELECTRICAL CIRCUITS AND MEASUREMENTS

KIRCHOFFS LAW



TOPIC OUTLINE

- Kirchoff's Law
 - KCL
 - KVL
- Problems



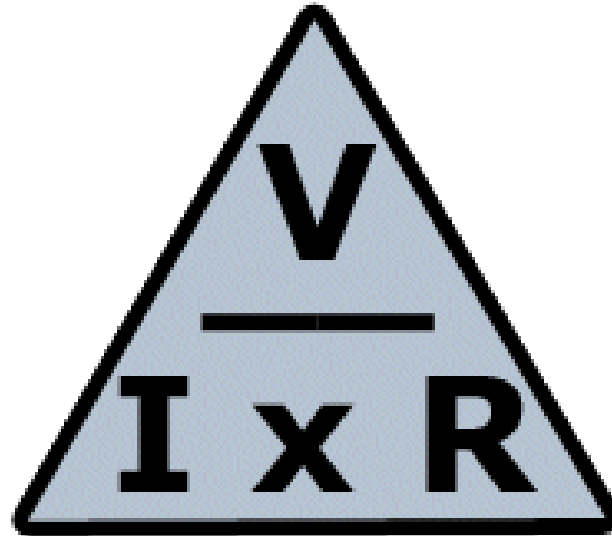


OHMS LAW - RECAP

- $V = I \times R$

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

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

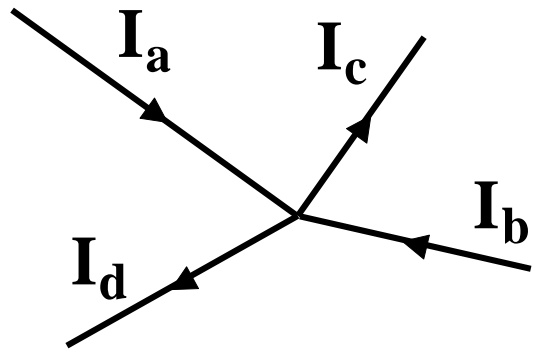




KCL

▪ Kirchoff's **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 **V**oltage **L**aw (**KVL**):

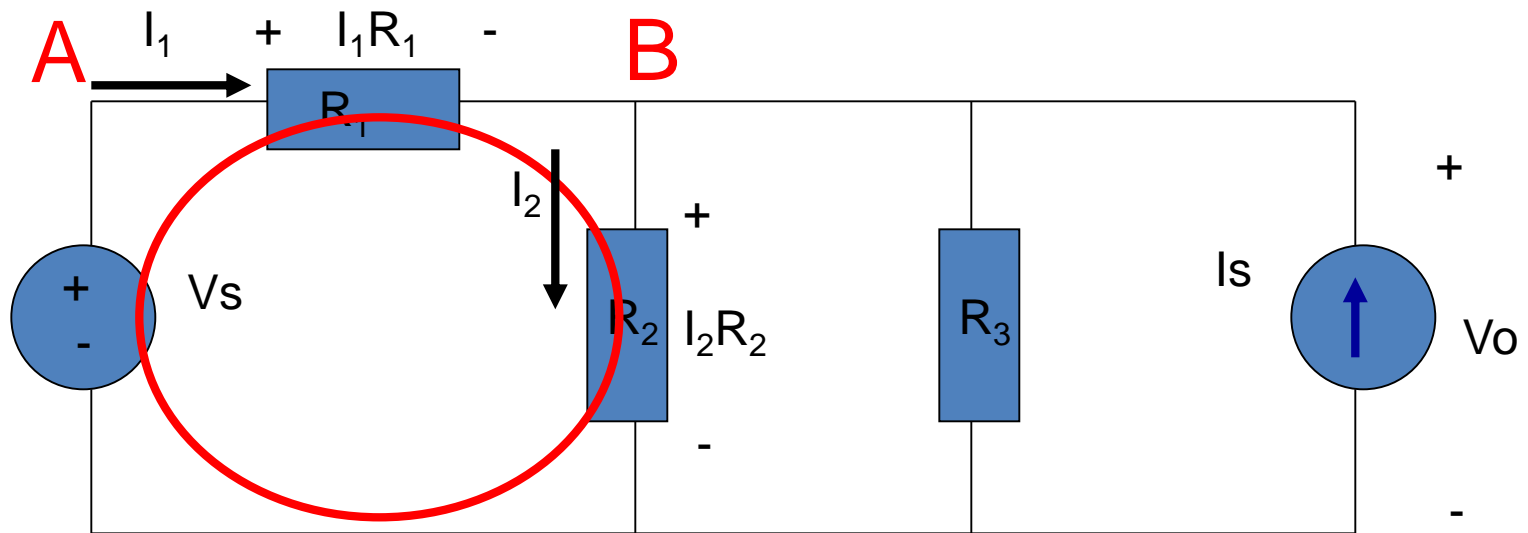
- The algebraic sum of voltages around each **loop is zero**
- Σ voltage drops - Σ voltage rises = 0
- **Or** Σ voltage drops = Σ voltage rises





EXAMPLE

- Kirchoff's Voltage Law around 1st Loop



Assign current variables and directions

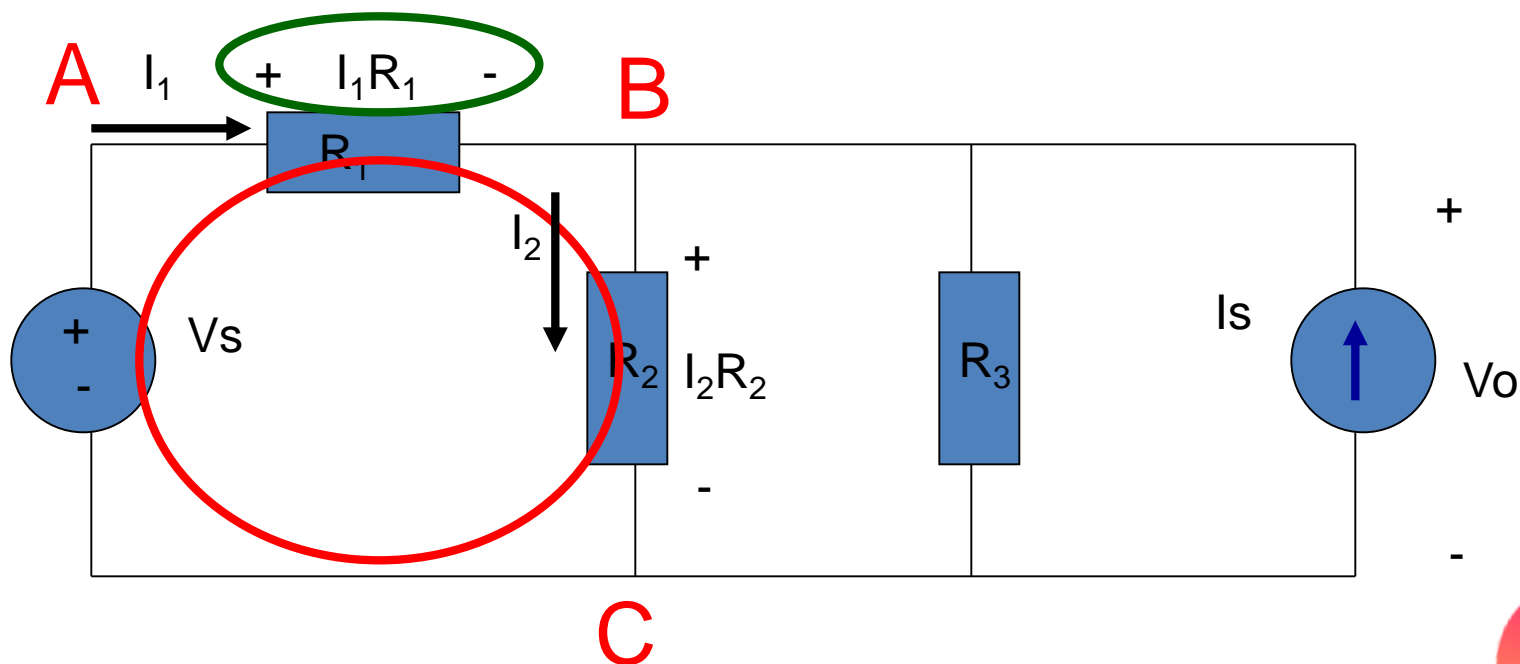
Use Ohm's law to assign voltages and polarities consistent with passive devices (current enters at the + side)





EXAMPLE

- Kirchoff's Voltage Law around 1st Loop



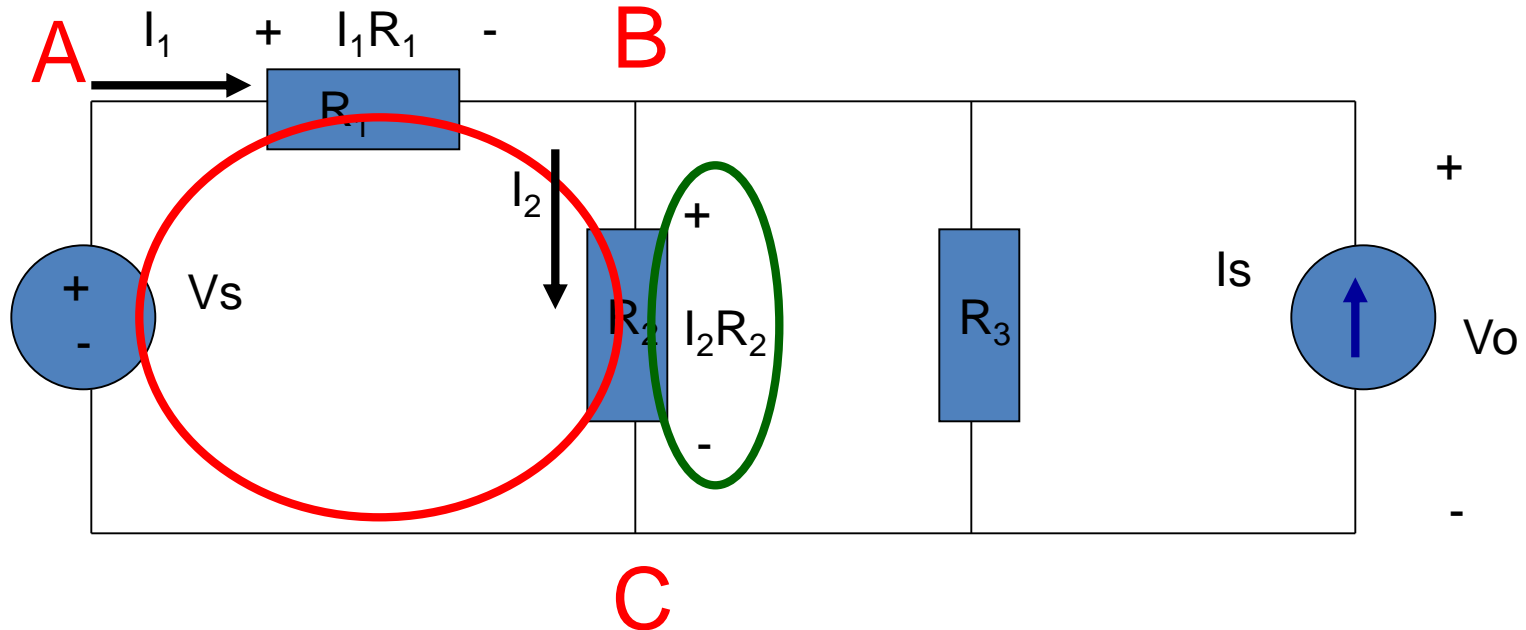
Starting at node A, add the 1st voltage drop: $+ I_1 R_1$





EXAMPLE

- Kirchoff's Voltage Law around 1st Loop

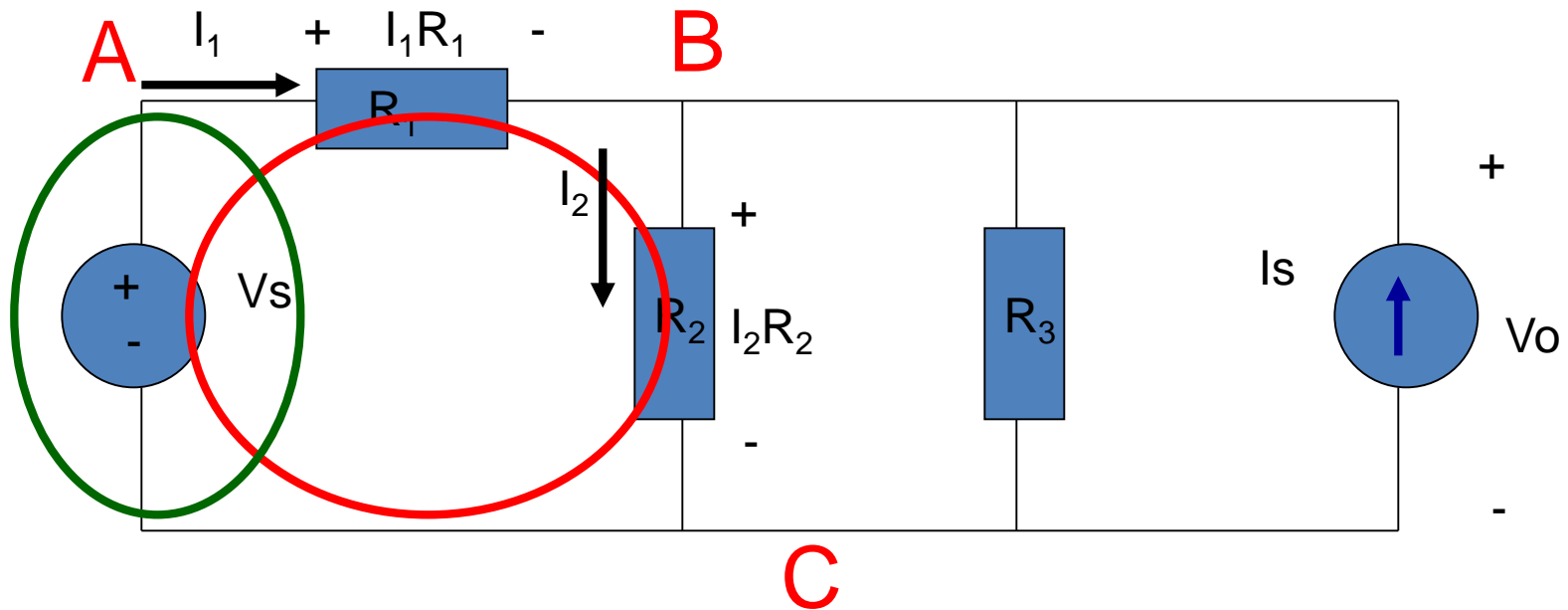


Add the voltage drop from B to C through R_2 : $+ I_1R_1 + I_2R_2$



EXAMPLE

- Kirchoff's Voltage Law around 1st Loop



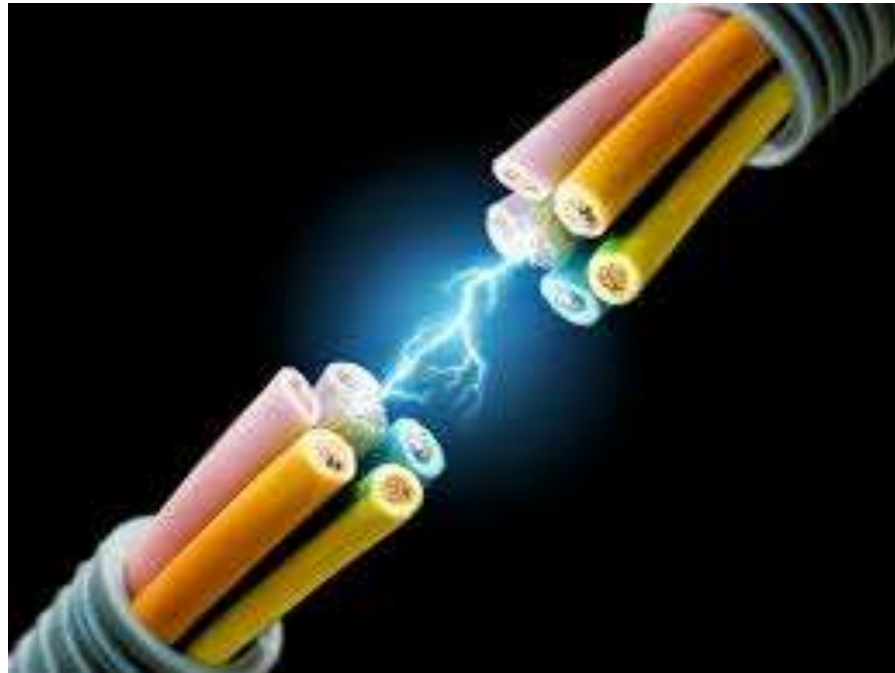
Subtract the voltage rise from C to A through V_s : $+ I_1 R_1 + I_2 R_2 - V_s = 0$

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





RECAP...



...THANK YOU

