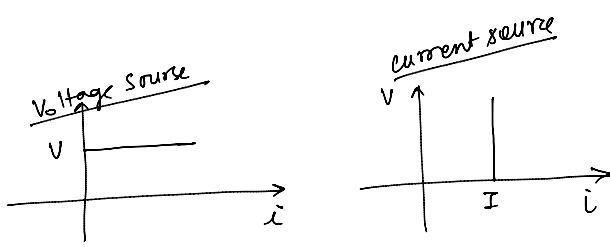
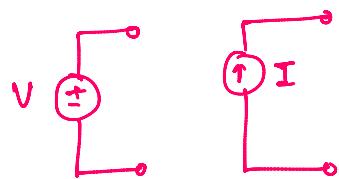


Lecture 2

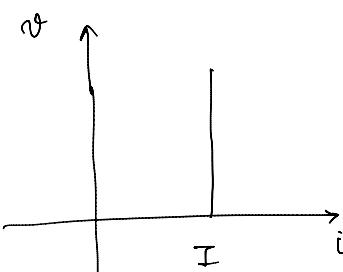
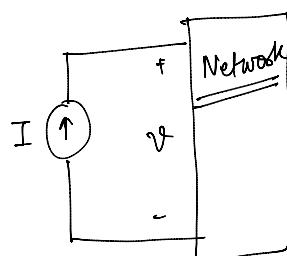
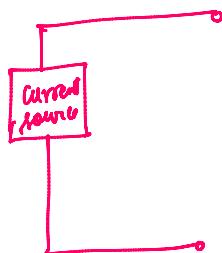
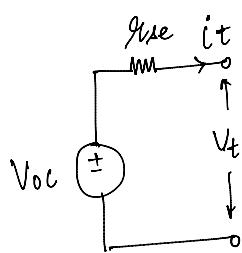
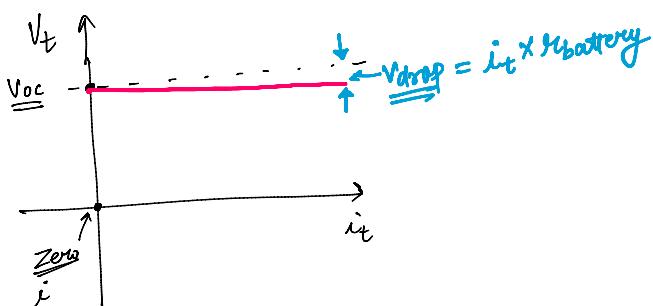
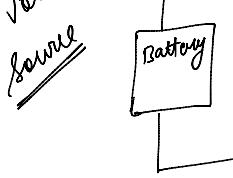
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Ideal sources

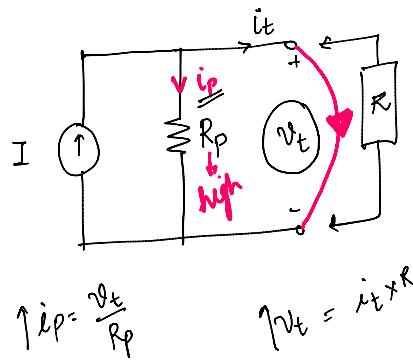


Practical source

voltage
source

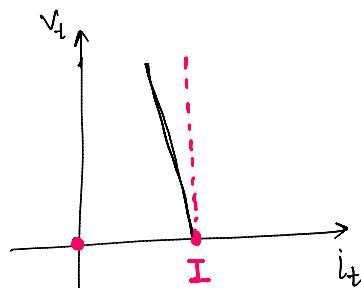


$1/R_2 \approx 1/k_A, M_R$



$$\uparrow i_{ip} = \frac{V_t}{R_p}$$

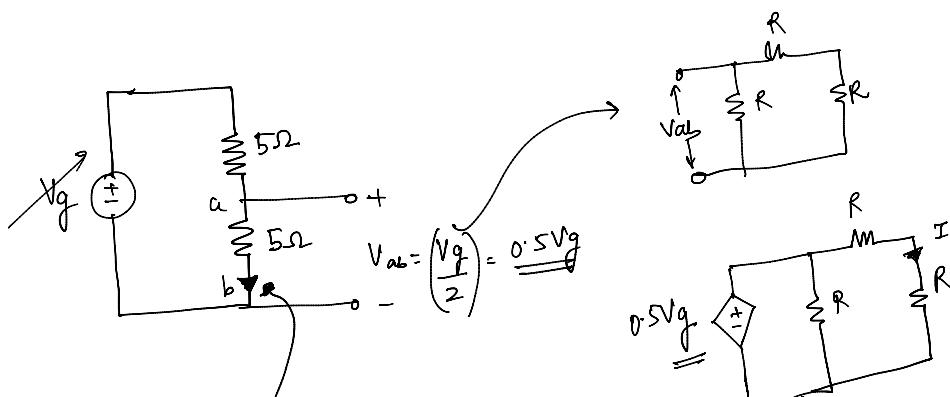
$$\uparrow V_t = i_t \cdot R$$



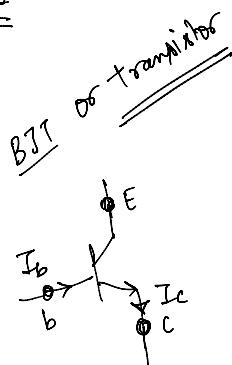
Dependent Sources :

- transistor
- ① voltage controlled voltage source →
 - ② voltage controlled current source →
 - ③ current controlled voltage source →
 - ④ current controlled current source →

VCVS :



VCCI

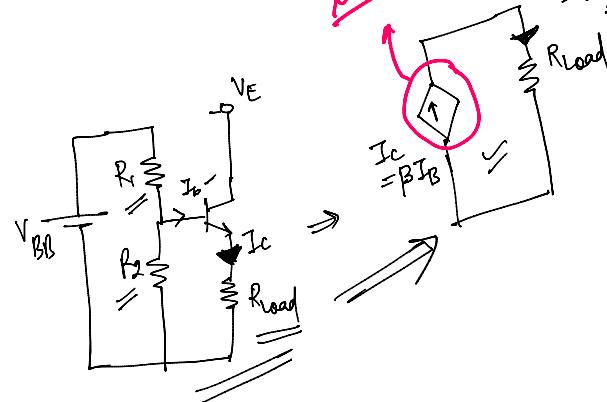


$$I_c = \beta I_b$$



Current source controlled current

$$P_{load} = I_c^2 R_{load}$$

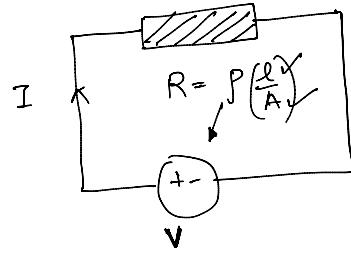


Ohm's Law :

$$\text{L} \rightarrow \tau \sim V \Rightarrow I = GV \Rightarrow \underline{\underline{V = IR}}$$

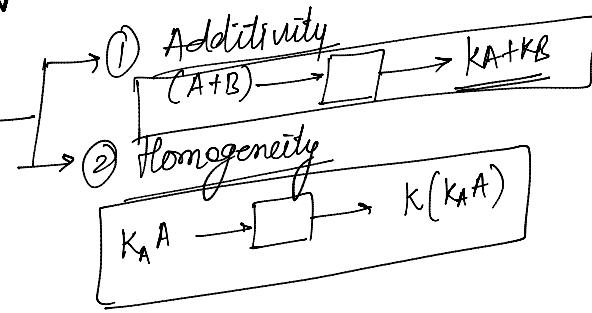
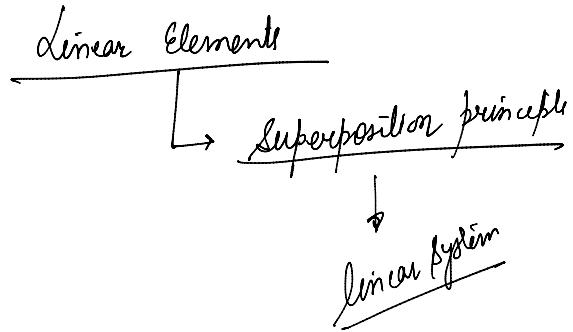
Ohm's Law :

$$I \propto V \Rightarrow I = GV \Rightarrow V = IR$$



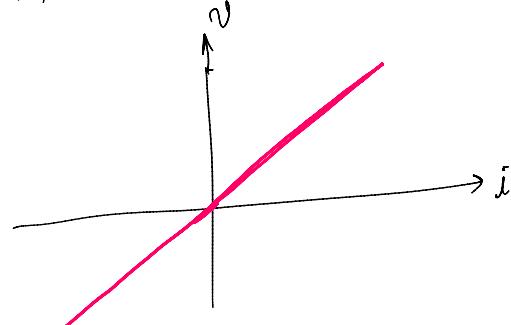
$$I \propto V$$

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



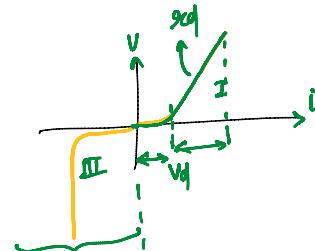
linear elements \rightarrow follow Ohm's law

$$\begin{aligned} \text{Resistor} &= V = iR \\ \text{Inductor} &= V = L \frac{di}{dt} \\ \text{Capacitor} &\rightarrow i = C \frac{dv}{dt} \end{aligned}$$

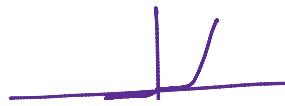
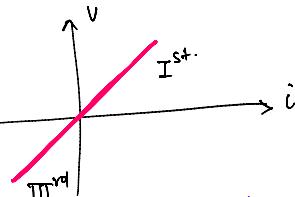
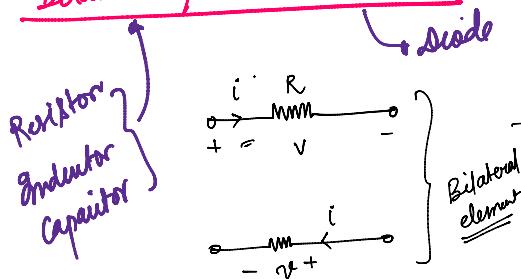


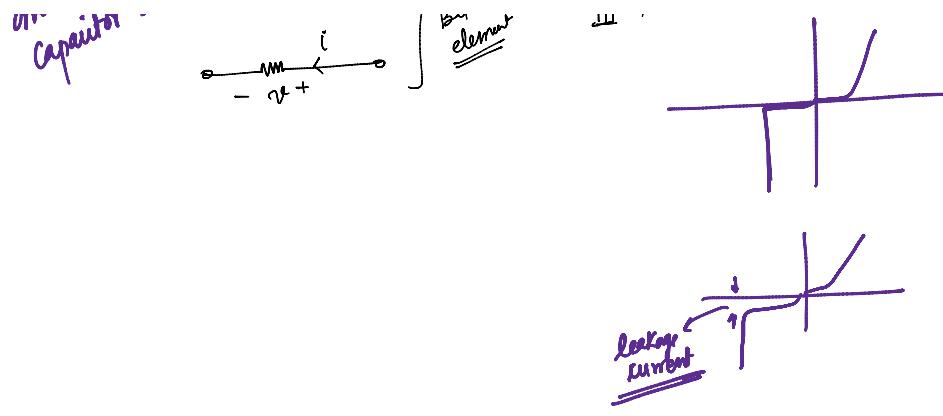
Non linear Elements

Diodes



Bilateral / Unilateral Elements





Active / Passive Elements:

Active Elements \rightarrow sources (Battery, Cell, Generator)
 op-amp (operational amplifier).

↓
when element is able to deliver energy independently

Passive Elements \rightarrow elements that absorb energy
 $\hookrightarrow \underline{\underline{R, L, C}}$