Exp6: First Order Circuits :-

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RC Circuits :- ⇝ Natural response :- $V_{c)n} = ke^{-t/\tau}$ (k: constant)

⇝ step response = $V_c = V_{c)n} + V_f$ ($V_f = V_s$ (Source))

$\tau = RC$

at $t < 0^-$: C: open circuit
at $t = 0^+$: C: voltage Source
at $t > 0$: C: open circuit

RL Circuits:

$\tau = L/R$

at $t < 0^-$: L: Short Circuit
at $t = 0^+$: L: . . Circuit
at $t > 0^-$: L: Short Circuit

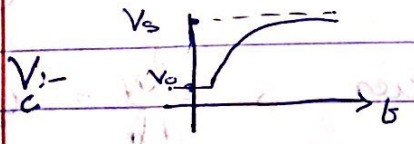
General form :-

$$r(t) = r(\infty) + [r(0^+) - r(\infty)]\, e^{-t/\tau}$$

where r is i_L or V_c for any voltage or current

• Note that :-

at $t = \infty$ (5τ) in step Response :-

V_c :- 

I_c :-