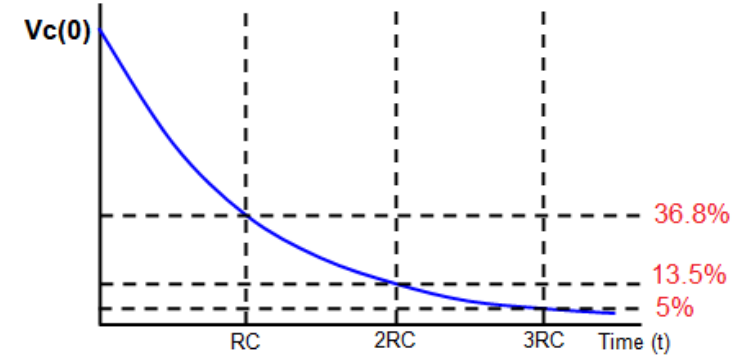
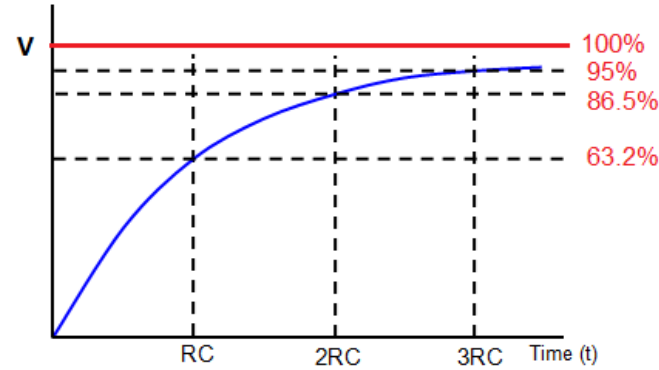
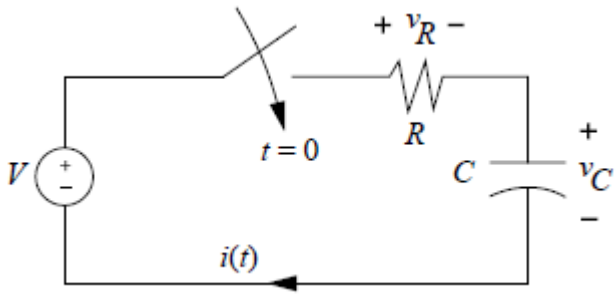




RC Transient response

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Time $t \geq 0$ Initial voltage across capacitor – $v_c(0)$ Time constant $\tau = RC$ Applied Voltage = V

$$v_c(t) = v_c(0)e^{-\frac{t}{RC}} + V(1 - e^{-\frac{t}{RC}})$$

$$i(t) = \frac{[V - v_c(0)]}{R} e^{-t/RC}$$

$$v_R(t) = i(t)R = [V - v_c(0)]e^{-t/RC}$$

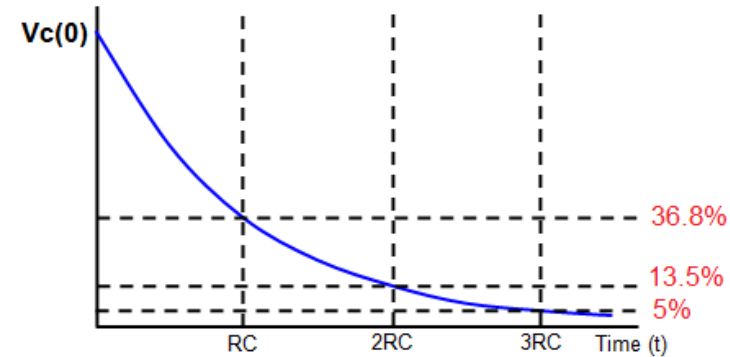
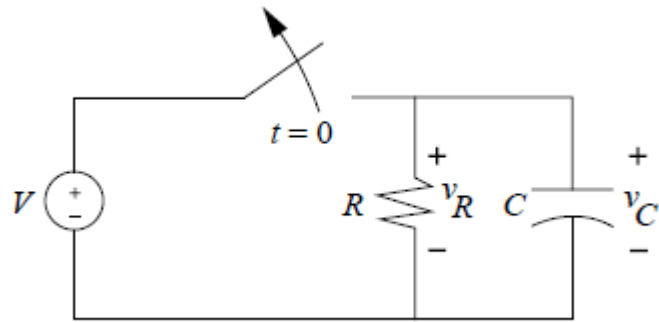
| Time constant $\tau = RC$ | % charged | % discharged |
|---------------------------|-----------|--------------|
| 1 | 63.2% | 36.8% |
| 2 | 86.5% | 13.5% |
| 3 | 95% | 5% |
| 4 | 98.2% | 1.8% |
| 5 | 99.3% | 0.7% |

RC Transient response

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STUDY FOR FE



Time $t \geq 0$ Initial voltage across capacitor – $v_c(0)$ Time constant $\tau = RC$ Applied Voltage = V

$$v_c(t) = v_R(t) = Ve^{-\frac{t}{RC}}$$

$$i_R(t) = -i_C(t) = \frac{V}{R}e^{-t/RC}$$

| Time constant $\tau = RC$ | % charge remaining |
|---------------------------|--------------------|
| 1 | 36.8% |
| 2 | 13.5% |
| 3 | 5% |
| 4 | 1.8% |
| 5 | 0.7% |