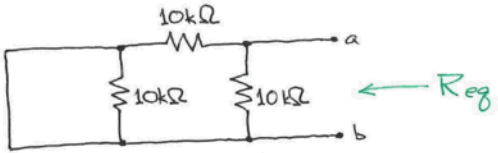
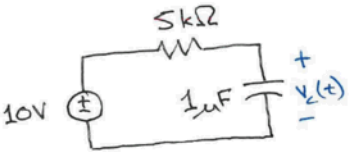
Since there are no dependent sources



$$R_{eq} = 10k\Omega \| 10k\Omega = 5k\Omega$$

The Thevenin equivalent is then:



$v_c(0) = 0$

$V_{oc} = 10V$

$\tau = RC = (5k\Omega)(1\mu F) = 5ms$

From which:

$$v_c(t) = V_{oc} + [v_c(0) - V_{oc}]\, e^{-t/\tau}$$

$$= 10 + [0 - 10]\, e^{-t/.005}$$

$$= \underline{10 - 10e^{-200t}\ V}$$

$$i_c(t) = C\frac{dv_c(t)}{dt}$$

$$= 10^{-6}(-10)(-200)\, e^{-200t}$$

$$= \underline{2e^{-200t}\ mA}$$

$$P_c(t) = v_c(t)\, i_c(t)$$
$$= (10 - 10e^{-200t})(2e^{-200t})$$
$$= \underline{20e^{-200t} - 20e^{-400t}\ mW}$$

$$w_c(t) = \frac{1}{2} C v_c^2(t)$$
$$= \frac{1}{2}(10^{-6})(10 - 10e^{-200t})^2$$
$$= \underline{50 - 100e^{-200t} + 50e^{-400t}\ \mu J}$$

Now determine the power absorbed by the resistors:

$$P_{R_1} = \frac{V_s^2}{R_1} = \frac{20^2}{10^4} = \underline{40\ mW}$$

$$P_{R_2}(t) = \frac{[V_s - v_c(t)]^2}{R_2}$$
$$= \frac{(10 + 10e^{-200t})^2}{10^4}$$
$$= \underline{10 + 20e^{-200t} + 10e^{-400t}\ mW}$$

$$P_{R_3}(t) = \frac{v_c^2(t)}{R_3}$$
$$= \frac{(10 - 10e^{-200t})^2}{10^4}$$
$$= \underline{10 - 20e^{-200t} + 10e^{-400t}\ mW}$$

For the power supplied by the source:

$$P_{V_s}(t) = P_{R_1} + P_{R_2}(t) + P_{R_3}(t) + P_C(t)$$

$$= \underline{60 + 20e^{-200t}\ mW}$$

Finally at $t = 10ms$:

$v_c = 8.647\ V$

$i_c = 270.6\ \mu A$

$P_c = 2.340\ mW$ (abs)

$P_{R_1} = 40\ mW$ (abs)

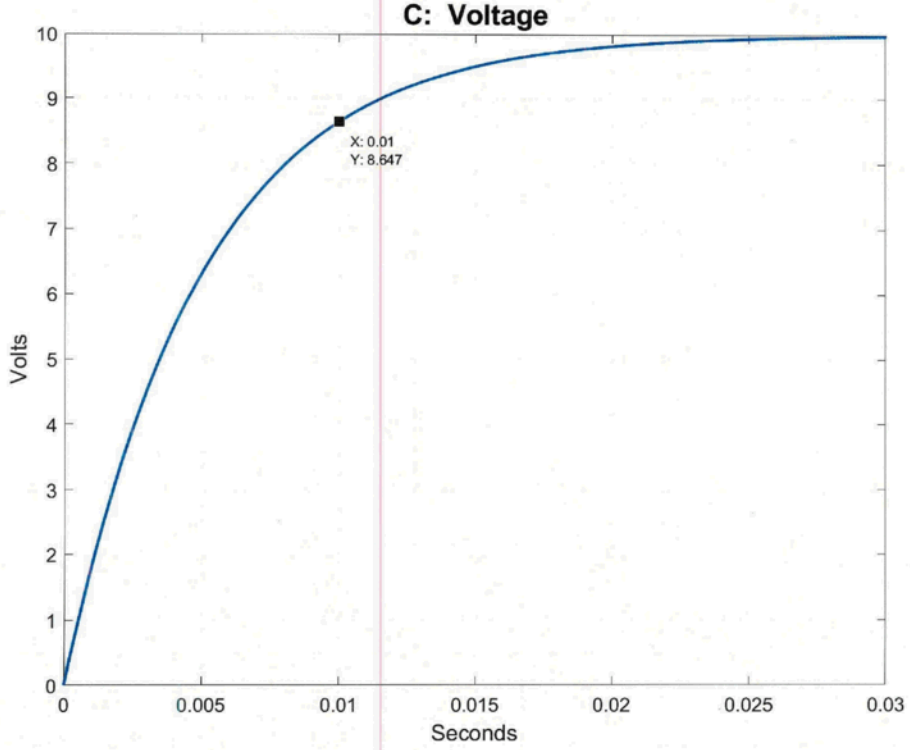
$P_{R_2} = 12.89\ mW$ (abs)

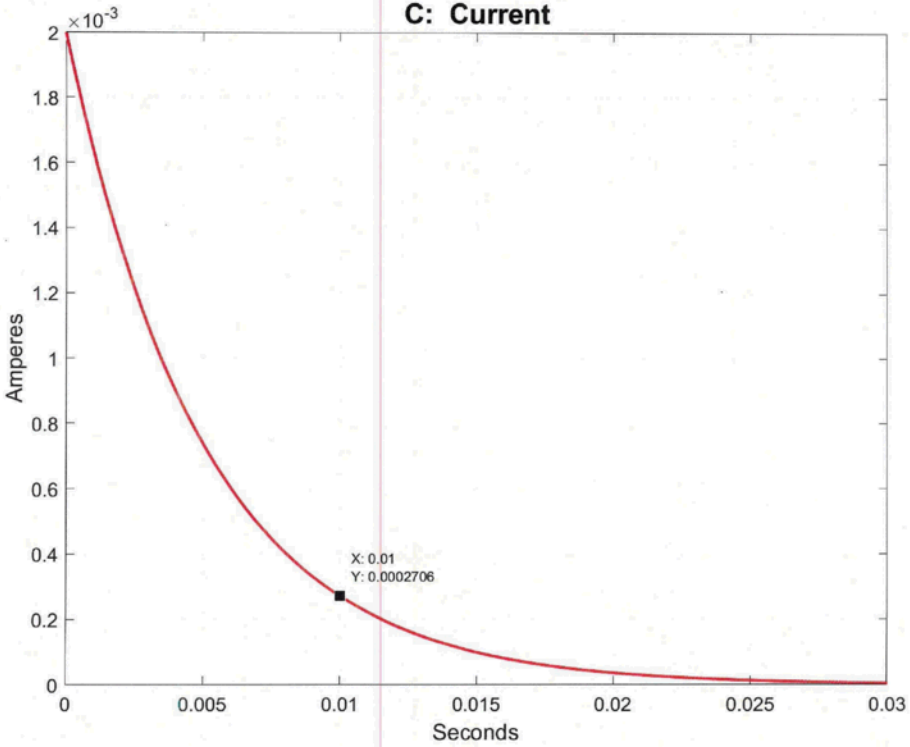
$P_{R_3} = 7.477\ mW$ (abs)

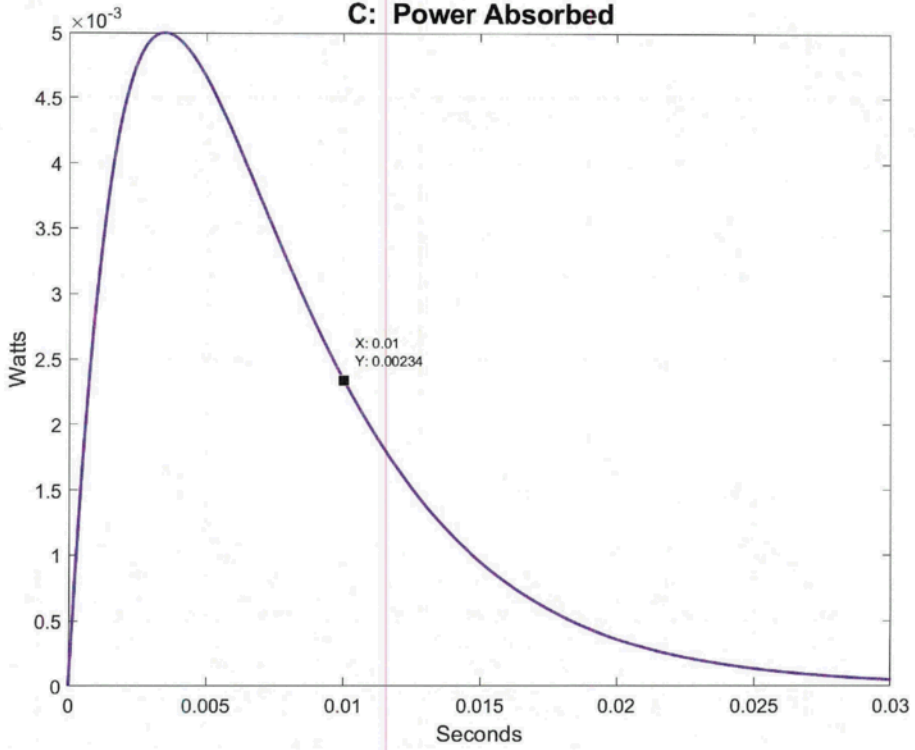
$P_{V_s} = 62.71\ mW$ (sup)

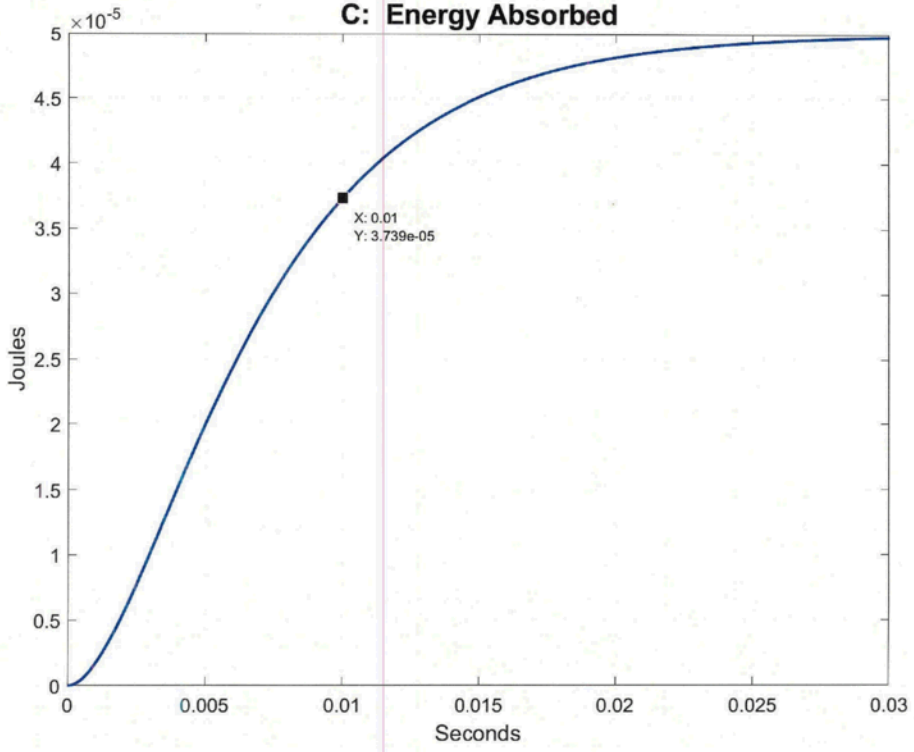
$w_c = 37.39\ \mu J$

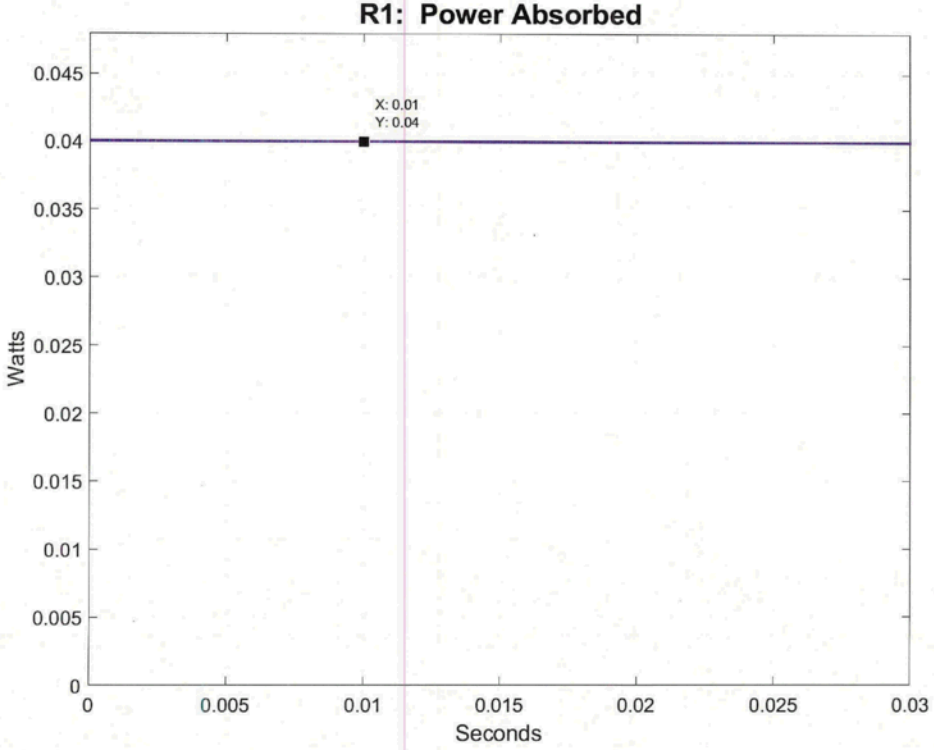
Note: $\sum P_{sup} = \sum P_{abs}$ ✓

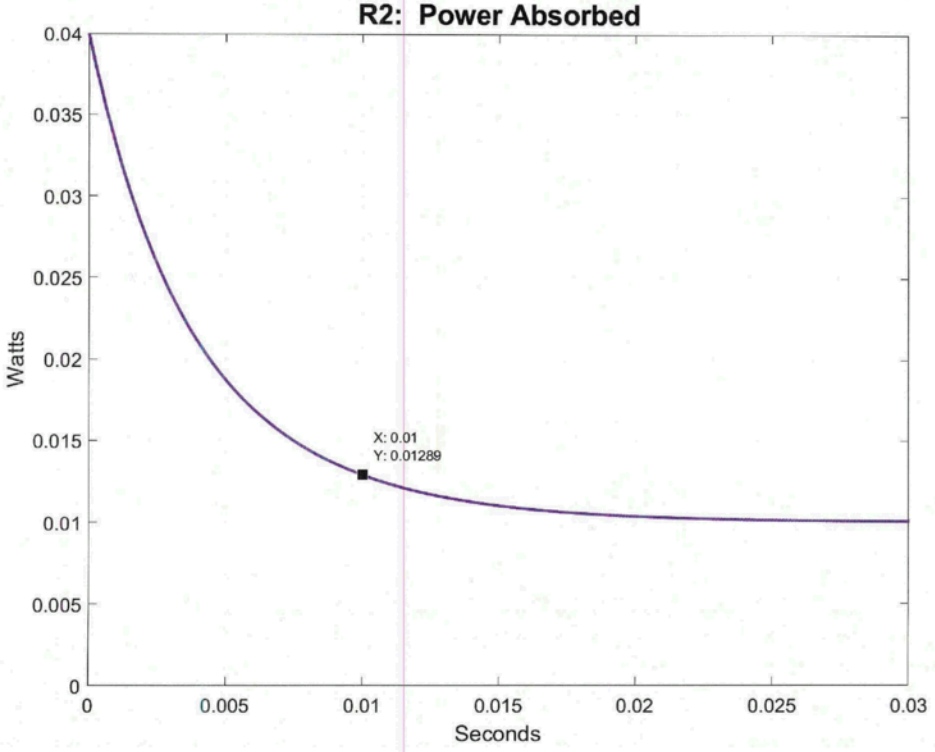

C: Voltage
X: 0.01
Y: 8.647
Volts
Seconds
0
1
2
3
4
5
6
7
8
9
10
0
0.005
0.01
0.015
0.02
0.025
0.03

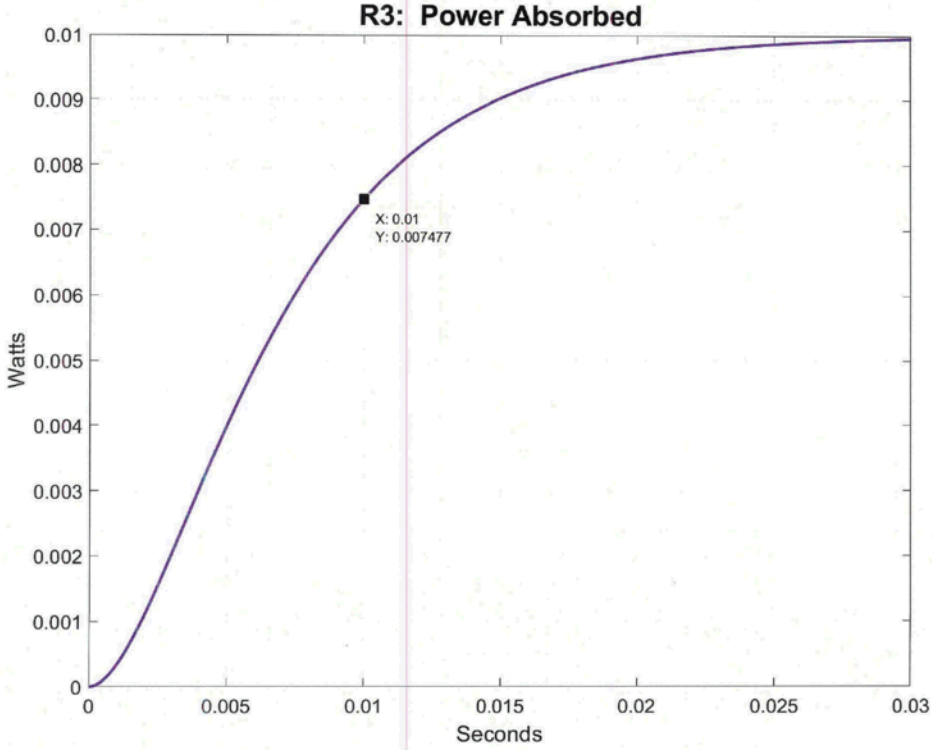

C: Current
×10^-3
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
Amperes
X: 0.01
Y: 0.0002706
0
0.005
0.01
0.015
0.02
0.025
0.03
Seconds


C: Power Absorbed
×10^-3
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Watts
X: 0.01
Y: 0.00234
0
0.005
0.01
0.015
0.02
0.025
0.03
Seconds


C: Energy Absorbed
×10^-5
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Joules
X: 0.01
Y: 3.739e-05
0
0.005
0.01
0.015
0.02
0.025
0.03
Seconds


R1: Power Absorbed
X: 0.01
Y: 0.04
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
Watts
0
0.005
0.01
0.015
0.02
0.025
0.03
Seconds


R2: Power Absorbed
Watts
Seconds
X: 0.01
Y: 0.01289
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
0
0.005
0.01
0.015
0.02
0.025
0.03


R3: Power Absorbed
Watts
Seconds
X: 0.01
Y: 0.007477
0
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
0.009
0.01
0
0.005
0.01
0.015
0.02
0.025
0.03