1st Order Transients – 5

more complex examples

Example: What percentage of the initial energy stored in the capacitor (at time 0) is dissipated in the 4 k Ω resistor by time 250 µsec?





36.8 %

Example: find i(t); this one is a bit tricky





Example: find $v_o(t)$





$$v_o(t) = -\frac{R_f}{R_1} e^{-t/R_1 C}$$

Example: find $i_o(t)$





Practice problem: find i(t)

t < 0: 0 A 0 < t < 5: $-e^{-3t} + 1$ A t > 5: $-2e^{-2.25t} + 3$ A



Practice problem: find $v_o(t)$, t > 0 $v_o(t) = -16e^{-4000t} V$



Practice problem: How much energy is stored in the capacitor at time t = 0? How much of this energy is dissipated by the 12 $k\Omega$ resistor by time t = 0.002 seconds? How long does it take to dissipate 95% of the energy? 0.217 mJ 86.5 % 0.003 sec

