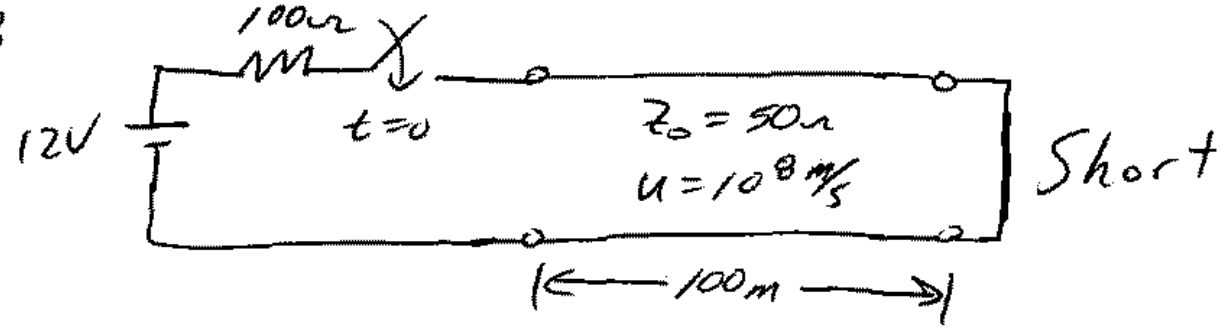
PE 11.8 Repeat Example 11.8 if the transmission line is (a) **Short-circuited**.

- Also, find steady-state currents and voltages at input and load.

ex. 11.8



plot voltage and current at load and generator ends for $0 < t < 6\mu s$

$$\Gamma_g = \frac{Z_g - Z_0}{Z_g + Z_0} = \frac{100\Omega - 50\Omega}{100\Omega + 50\Omega} = \underline{\underline{1/3}}$$

$$\Gamma_L = \frac{Z_L - Z_0}{Z_L + Z_0} = \frac{0 - 50}{0 + 50} = \underline{\underline{-1}}$$

$$T = \ell/u = \frac{100\,m}{10^8\,m/s} = \underline{\underline{1\,\mu s}}$$

$$V^+ = V_g \frac{Z_0}{Z_0 + Z_g} = 12V \frac{50}{50+100} = \underline{\underline{4V}}$$

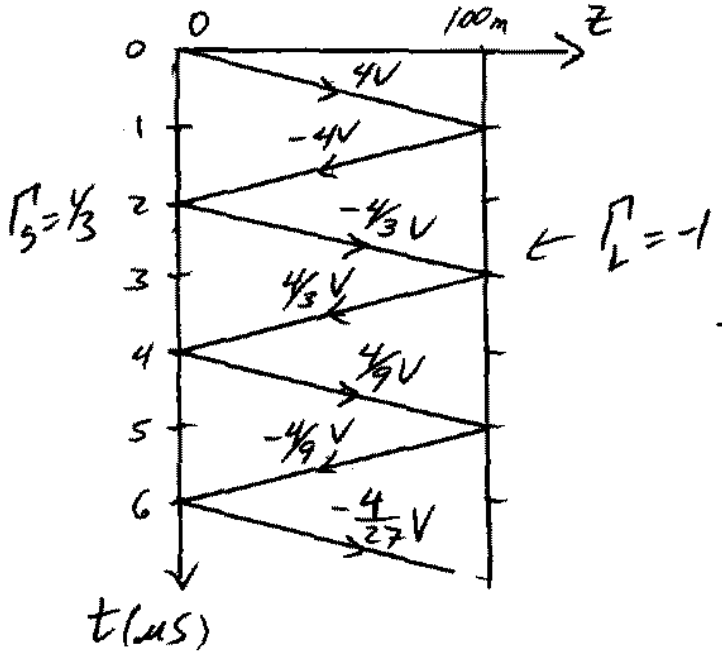
$$I^+ = \frac{V_g}{Z_0 + Z_g} = \frac{12V}{50+100} = \underline{\underline{80\,mA}}$$

$$V_{\infty,sc} = V_{sc}(0, t \to \infty) = V_{sc}(\ell, t \to \infty) = V_g \frac{Z_L}{Z_g + Z_L} = \underline{\underline{0}}$$

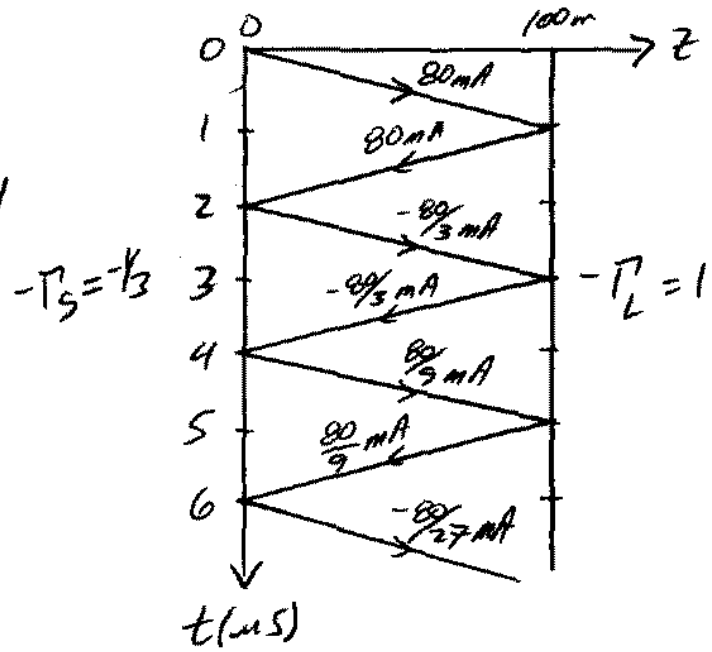
$$I_{\infty,sc} = I_{sc}(0, t \to \infty) = I_{sc}(\ell, t \to \infty) = \frac{V_g}{Z_g + Z_L} = \frac{12V}{100\Omega} = \underline{\underline{120\,mA}}$$

Bounce Diagrams

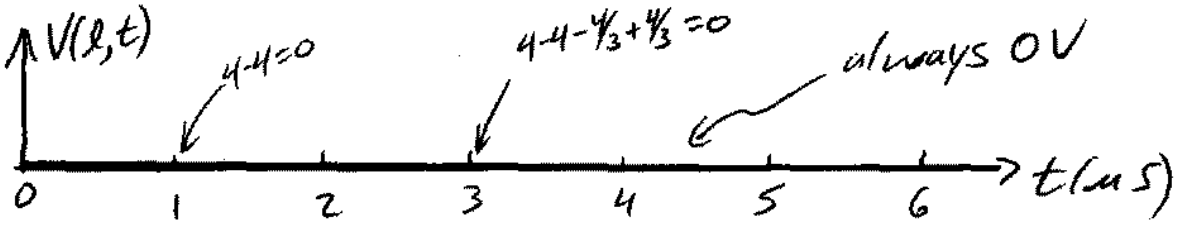
Voltage



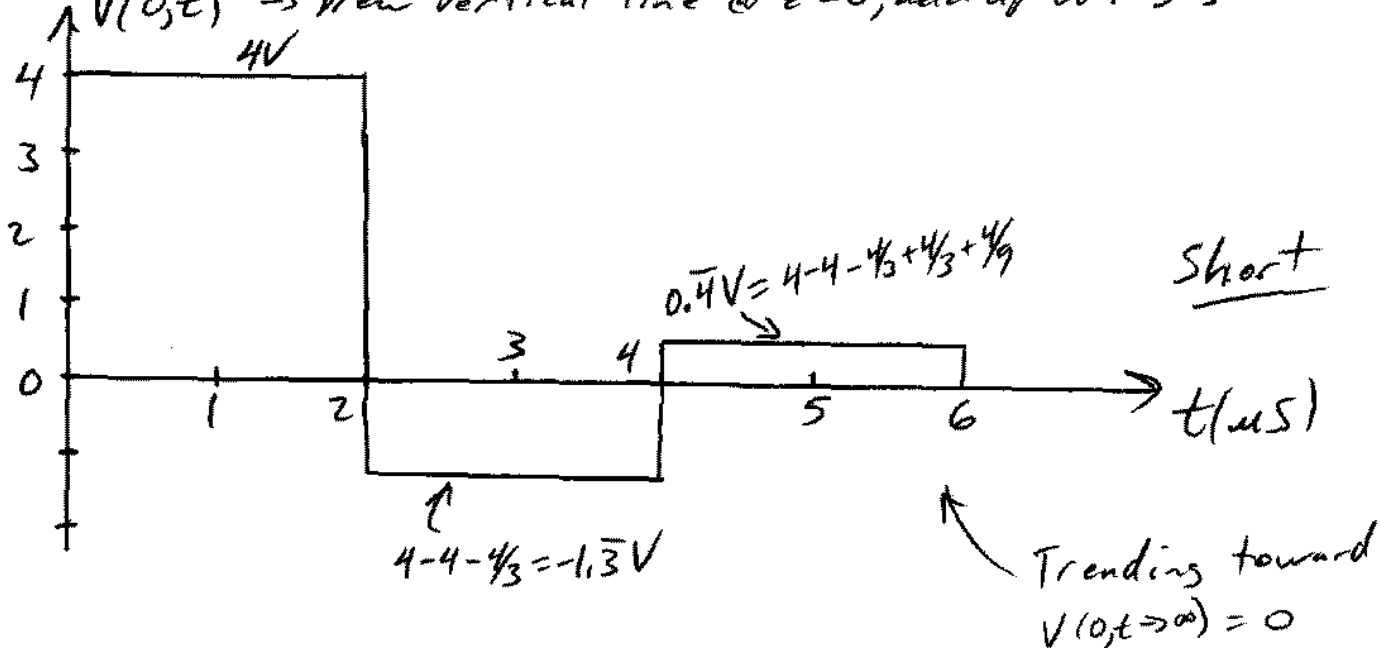
Current

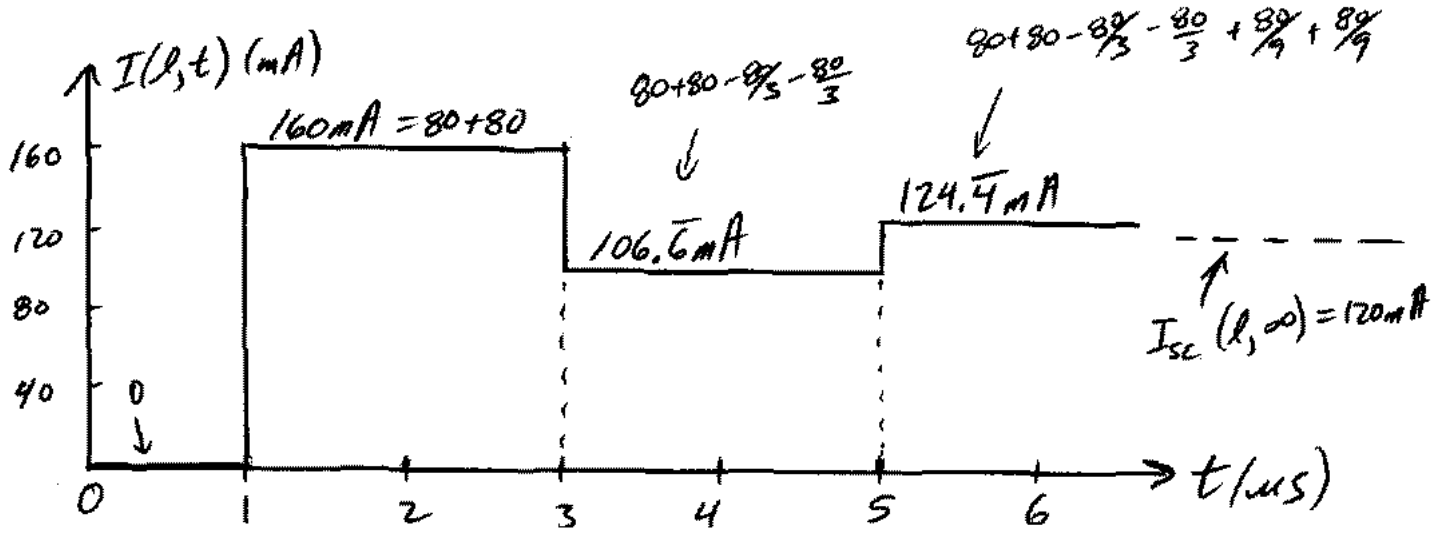


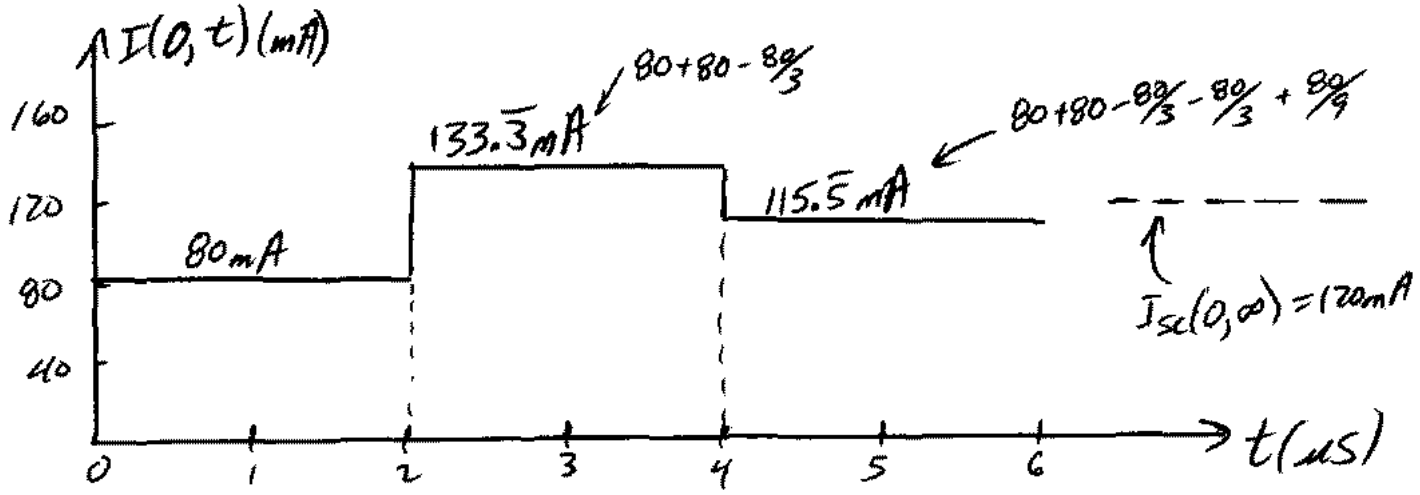
→ Draw vertical line @ z=100m, add up voltages as "bounces" arrive



V(0,t) → Draw vertical line @ z=0, add up voltages




I(l,t) (mA)
160mA = 80+80
80+80-80/3-80/3
80+80-80/3-80/3+80/9+80/9
106.6mA
124.4mA
160
120
80
40
0
$I_{sc}(l,\infty) = 120mA$
0 1 2 3 4 5 6 t(μs)


I(0,t) (mA)
80+80-80/3
80+80-80/3-80/3+80/9
133.3mA
115.5mA
80mA
160
120
80
40
$I_{sc}(0,\infty) = 120mA$
0 1 2 3 4 5 6 t(μs)