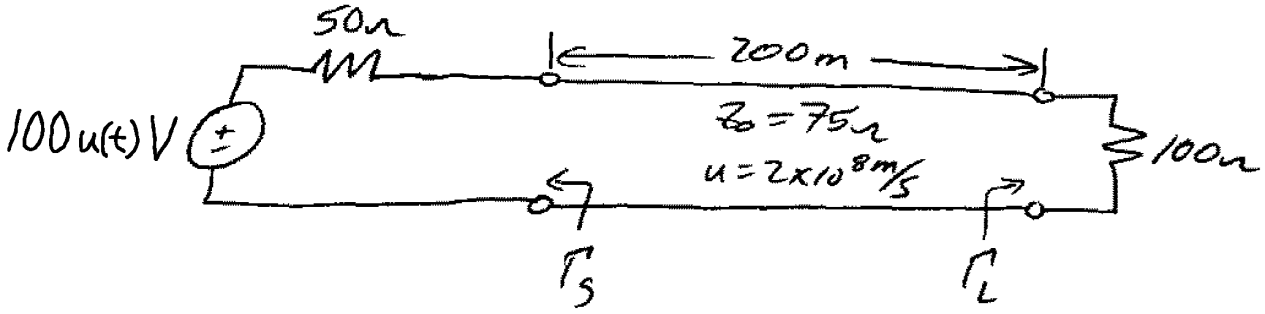
A 200 m long, lossless transmission line ($Z_0 = 75\ \Omega$, $u = 2 \times 10^8$ m/s) is driven by a generator with an open circuit voltage of $100\,u(t)$ V and a Thevenin resistance of $50\ \Omega$. It is terminated by a $100\ \Omega$ resistive load. Calculate the expected steady-state load current and voltage. Then, find and sketch $V(l, t)$ and $I(l, t)$ for $0 < t < 6$ μs.

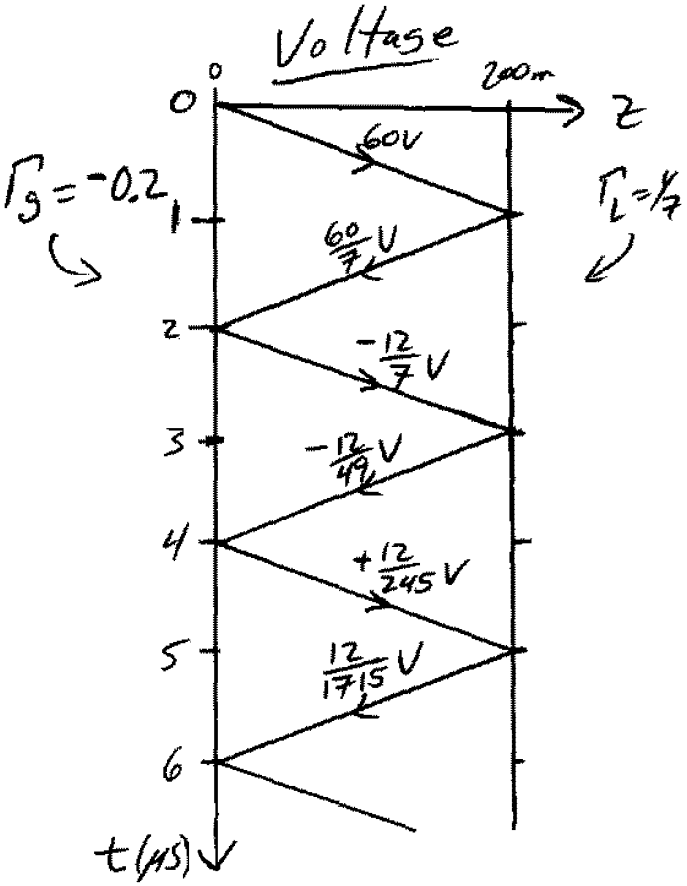


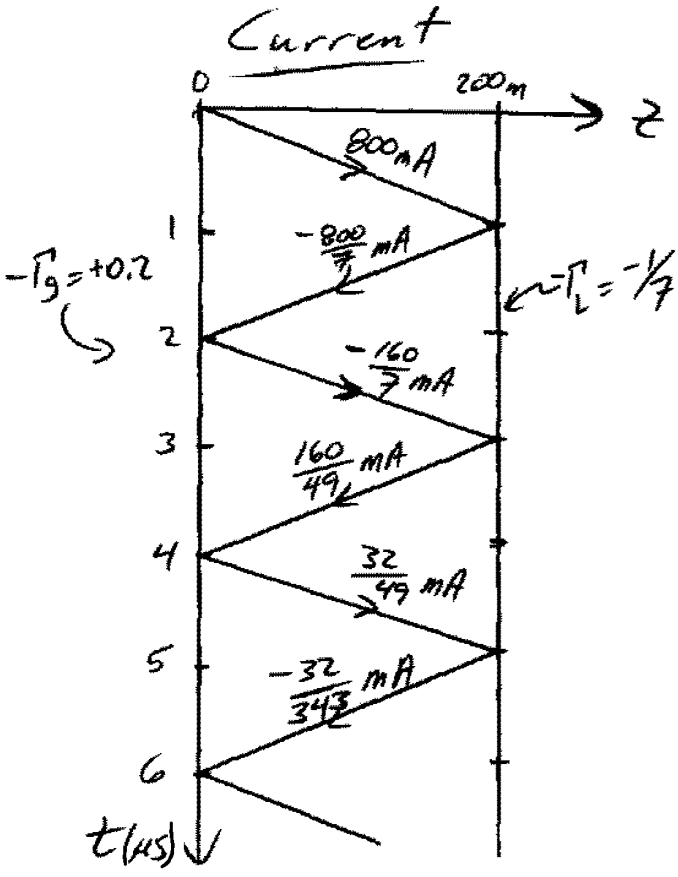
$\Gamma_g = \frac{50-75}{50+75} = -0.2$ $\quad \Gamma_L = \frac{100-75}{100+75} = 1/7$

$T = l/u = \frac{200}{2\times10^8} = 1\,\mu s$

$V^+ = (100\text{V})\frac{75\Omega}{50+75\Omega} = 60\text{V}$ $\quad V_{L,\infty} = 100\frac{100}{50+100} = 66.\overline{6}\text{V}$

$I^+ = \frac{100\text{V}}{50+75\Omega} = 0.8\text{A} = 800\text{mA}$ $\quad I_{L,\infty} = \frac{100}{50+100} = 666.\overline{6}\text{mA}$





→ Draw vertical lines @ $z = \ell = 200m$ on bounce diagrams.

→ Note (and add) voltage waves as they arrive @ $z = \ell$