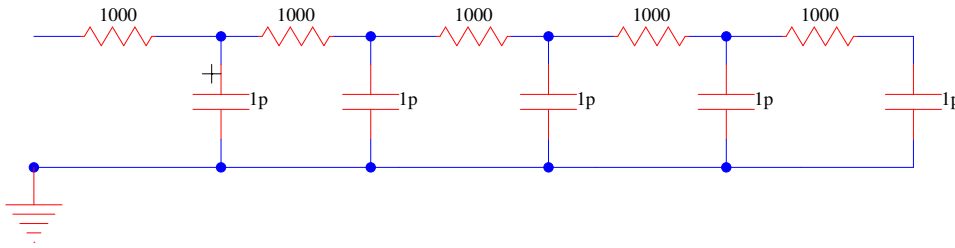
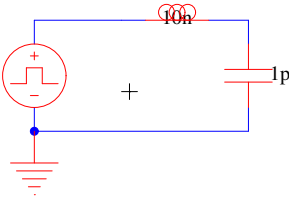


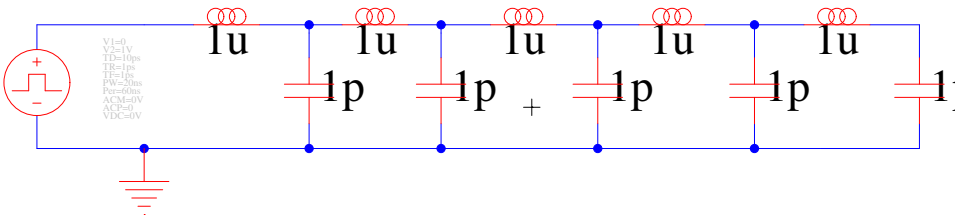
1. What is the step response of an RC ladder chain?



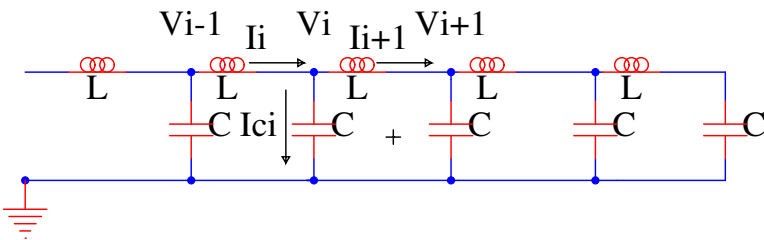
2. What is the response of a 1-stage LC ladder?



3. What is the step response of an LC ladder chain?



4. Considering:



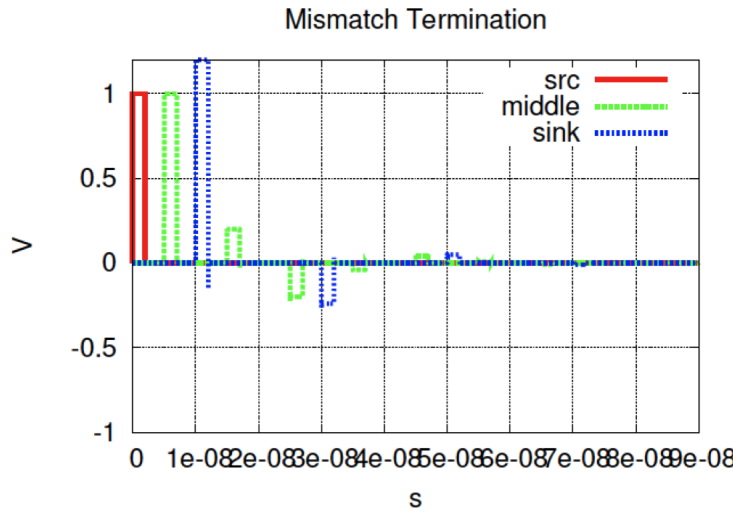
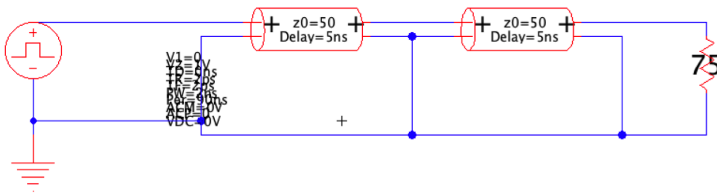
(a) Write Q needed to charge C to V_i

(b) What is I_i given charge velocity $w = \frac{1}{\sqrt{LC}}$?

(c) Combine (a) and (b) and solve for $R = \frac{V_i}{I_i}$

5. What happens at source end of transmission line?

6. Below we see what happens when a short-circuit source drives a 50Ω line with a 75Ω termination.



7. Consider a 25 meter long Category-5e cable with $w = 0.64c$ (Speed of light $c = 3 \times 10^8\text{m/s}$) used for 1 Gigabit ethernet. Each of the 4 cable pairs supports bits at 250Mb/s.

(a) How long (in nanoseconds) does it take for a bit to travel the 25 meter length of the cable?

(b) How long (in nanoseconds) between introducing bits onto the cable?

(c) How many bits are on each wire pair “in the cable” at any point in time?

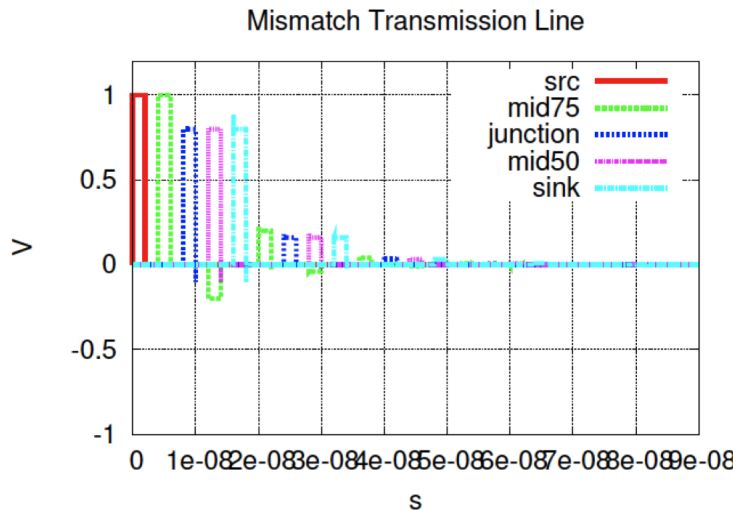
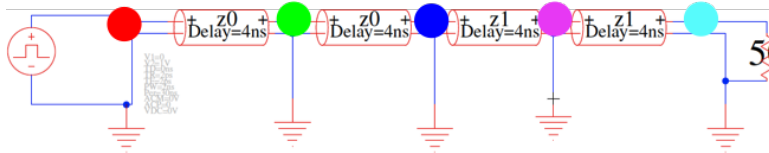
8. What effects limit throughput of bit pipelining on a transmission line?

9. What happens if there is a resistance $R = 0.2\Omega$ every meter of an otherwise lossless 100Ω transmission line (Category-5e cable)?

(a) Voltage impact at each meter?

(b) How long can cable be before voltage reduced by one half?

10. What happens when impedance of line changes? ($Z_0=75\Omega$ to $Z_1=50\Omega$). All transmission lines same length.



11. Transmission Line Branch. All transmission lines same length with $Z_0 = 50\Omega$.

