ELEN 624
Signal Integrity

Homework #2

1. Determine the lattice diagram and response (using a time-voltage graph) as shown in Fig. 2.13. Assume that the source impedance is 40 ohm and the load impedance is 30 ohm. Also assume the same source and $Z_0$ as in Fig. 2.13, and has 0 risetime. Assume TD=200ps. Is this an overdriven or underdriven line?

2. Suppose that an interconnect between a driver and receiver has 3 dB “half-power” bandwidth of 8 GHz. Now suppose the receiver needs at least a third harmonic of the fundamental carrier frequency to properly distinguish bits. What is the maximum data rate (in Gbps) for bit transmission in this circuit?

3. Using a Bergeron diagram and following the example in Fig. 2.19 (pg. 28 of the text), determine the response for a diode termination system where $V_s=2$ V, TD = 1000 ps, $Z_0 = 50$ ohm, $Z_s = 40$ ohm, 0 ps risetime, and the diode behaves according to

$$I = 10^{-15} \left( \frac{V}{e^{3.0(25.4mV)}} - 1 \right).$$