

25 Spring ECEN 720: High-Speed Links: Circuits and
Systems Pre-lab Report

Lab5: Equalization Circuits

Name: Yu-Hao Chen

UIN:435009528

Section:700

Professor: Sam Palermo

TA: Srujan Kumar Kaile

1.

1. Assuming a 3-tap TX FIR equalizer with the z -domain transfer function as the following

$$W(z) = -0.1 + 0.6z^{-1} - 0.30z^{-2} \quad (13)$$

Please find the low frequency response, Nyquist frequency response, and frequency peaking of this 3-tap TX FIR equalizer?

$$z = e^{-j\omega}$$

$$\text{low frequency : } z = 1 = -0.1 + 0.6 - 0.3 = 0.2$$

$$[1, 1, 1] * [-0.1, 0.6, -0.3] = [0.2, 0.2, 0.2]$$

$$\text{nyquist freq, } (\pi) : z = e^{-j\pi} = -1 = -0.1 - 0.6 - 0.3 = -1$$

$$[-1, 1, -1] * [-0.1, 0.6, -0.3] = [1, -1, 1]$$

$$\text{peaking : } 0 \sim \pi = 0.2 \sim 1$$

$$\frac{1}{0.2} = 5 = 13.97 \text{ dB}$$

2. Design a passive CTLE as shown in Figure 7(a) to realize the transfer function as shown

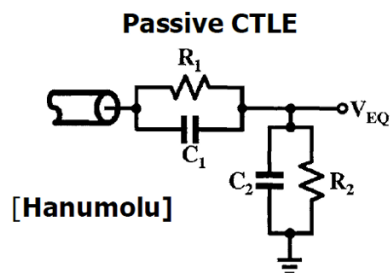
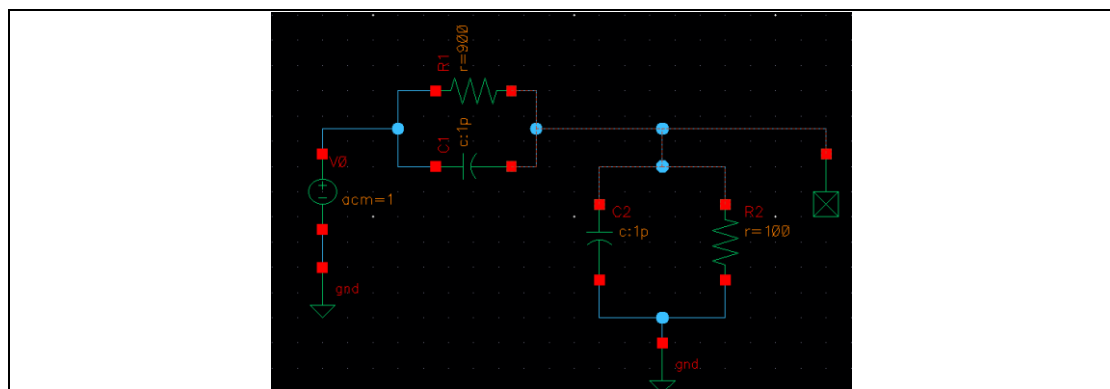
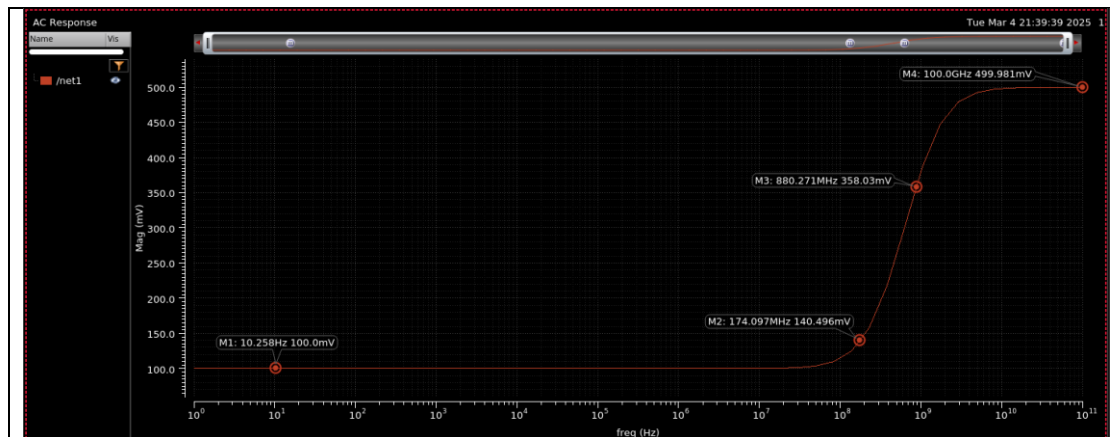


Figure 7. (a) Passive CTLE





3. 3. Design a 4-bit parallel PRBS generator with 27-1 sequence length and an error detector circuit with a testing circuit at 2Gb/s with ideal blocks. Using the test circuit, you should be able to inject error data pattern and observe the error signal. An example is shown in Figure 13. Please show the simulation results. You may refer to the Appendix by Younghoon Song on how to build a parallel PRBS generator and detector.

