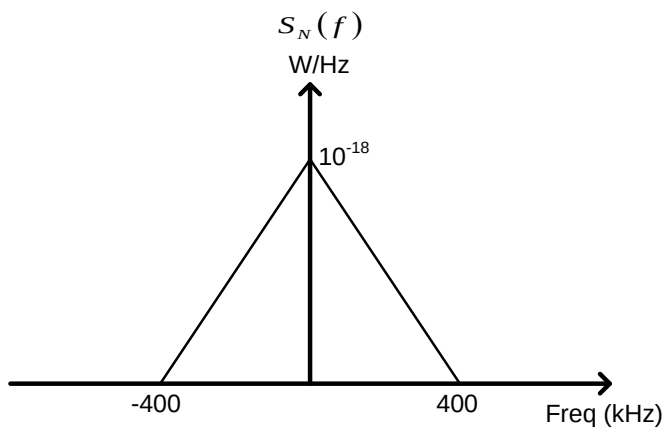
EE354 Homework #8

1. The binary sequence "11100101" is applied to a BPSK modulator. The bit time is 1.0 μsec, and the carrier frequency is 200 kHz. Determine:

   (a) The transmitted bandwidth.
   (b) Plot the BPSK waveform in the time domain assuming a phase of 0 / 180°.
   (c) Plot the BPSK waveform in the time domain assuming a randomized carrier phase.
   (d) Sketch the spectrum of the BPSK signal.

2. An FSK transmission consists of 800 kHz and 900 kHz bursts. The higher frequency is associated with a binary 1. Find the FSK bandwidth and sketch the FSK spectrum.

3. A DSB-SC signal is transmitted over a noisy channel, where the power spectral density of the noise is as shown below. The maximum frequency of the information signal is 4 kHz, the carrier frequency is 200 kHz, and the received power level is -80 dBm. Determine the output SNR of the system in dB.



4. A DSB-TC signal is transmitted over a noisy channel where the average noise power is $\frac{N_0}{2} = 10^{-6}$ W/Hz. The DSB-TC signal has a carrier power of 80 Watts, and the Upper and Lower Sidebands each have 10 Watts of power. The maximum frequency of the information signal is 4.0 kHz. Determine the output SNR of the system in dB.

5. A commercial broadcast system is transmitting an FM signal. The information signal has a maximum frequency of 16 kHz, the VCO has a center frequency is 430 MHz and $k_f = 40\,kHz/V$. The transmitted bandwidth is 200 kHz. The received signal amplitude is 10 mV, and the One-Sided noise spectral density is $N_0 = 10^{-8}\,W/Hz$. Determine the output SNR of the system in dB.