Digital Communications
Homework #3
Due 9/14/2007

1. Problem 5.10 in the text

2. Problem 5.18 in the text

3. Problem 5.21 in the text. Note: In part (b) the maximum power should be specified in terms of the step size Δ , the frequency of the sinusoidal wave f_m, and the sampling period T_s.

4. Problem 5.22 in the text

5. Problem 5.24 in the text

6. Consider an analog power signal with a bandwidth (consider it to be the absolute bandwidth) of 200kHz. It is to be converted to a digital signal using pulse code modulation with binary non-return to zero encoding and square pulses. It can be assumed that the original analog signal is uniformly distributed. The required quantization SNR (or SDR) is 35dB. Determine the minimum data rate of the digital signal that allows the system to exceed the required quantization SNR. (b) What is the minimum bandwidth required for the resulting digital signal if the bandwidth is measured as the 30dB-bandwidth? (c) What is the minimum 30dB bandwidth if the pulse is a triangular pulse (use a Matlab plot to help determine this). (d) What is the minimum bandwidth if the system uses delta modulation with triangular pulses?