Homework # 1: Additional Problems
EECS 869: Error Control Coding
Fall 2015

E1 Reproduce the capacity curve in Figure 1.22 of the text for the case of the binary AWGN continuous output channel (labeled as "BAWGNC" in the figure). The capacity is given by Equation (1.40) in the text. You will find the author's MATLAB code helpful in doing this (on p. 45, in the page margin on the right, he indicates the files he used). IMPORTANT: label the x-axis of your plot with E_b/N_0 (dB scale), and the y-axis of your plot with Capacity (linear scale), which is different from the plot in the book.

E2 Plot the capacity of a bandwidth and power constrained AWGN channel, the famous equation

$$C = W \log_2 \left(1 + \frac{P}{N_0 W} \right).$$

IMPORTANT: label the x-axis of your plot with E_b/N_0 (dB scale), and the y-axis of your plot with C/W (log scale). The units of C/W are bits/Hz/channel use. You will have to take a few steps to make E_b/N_0 appear in the above equation, we went over this in class. If you would like, you can take your curve from the first problem and plot it on this same axis (E_b/N_0 vs. log-Capacity) just so see the difference between the capacities for the two cases.