Extended Golay Code
EECS 869: Error Control Coding
Fall 2017

Complete the following tasks. You should submit an e-mail with one .m file attachment and a separate PDF document with the requested plot (use esp@eecs.ku.edu).

1. **Implement the Arithmetic Decoding Algorithm for the Extended Golay Code.** The arithmetic decoding algorithm for the (24,12,8) extended Golay code is found on p. 402 of the textbook and is labeled as **Algorithm 8.2**. You should implement this as a MATLAB function with the following syntax:

   ```
   c_hat = ExtendedGolayDecoderXXX(r);
   ```

   where **r** and $\hat{\mathbf{c}}$ are 1×24 MATLAB vectors containing ones and zeros. Although the author of your textbook has provided various MATLAB files for your use, for this assignment I expect you to submit your own original MATLAB code. You should submit your function via e-mail (use esp@eecs.ku.edu), and don't forget to replace `XXX` with your first name.

2. **Generate $P(E)$ and P_b Curves for the Extended Golay Code.** To generate $P(E)$ and P_b curves, we need the weight enumerator $A(z)$ and the message weight enumerator $\beta(z)$. The weight enumerator is given in Table 8.2 of the textbook, but you are on your own with $\beta(z)$. Provide a plot of $P(E)$ and P_b in the standard format we've used so far: probabilities displayed on the log scale, E_b/N_0 expressed in dB. You can assume the use of the binary symmetric channel (BSC), where the underlying channel is BPSK modulation with AWGN and hard decisions. This is the same channel we used in the previous project. Include a curve for uncoded BPSK as a reference, and use E_b/N_0 in the range of 0 to 10 dB.