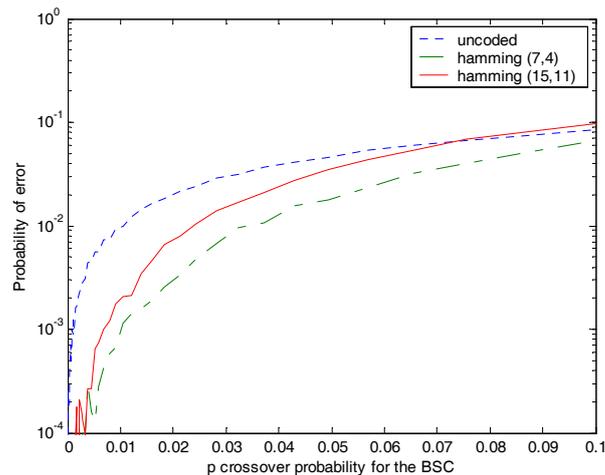


King Fahd University of Petroleum & Minerals
Department of Electrical Engineering
EE430 Information Theory and Coding

Computer Assignment III: Performance of Hamming Codes over BSC (2%)

Due: Week 14 / Class 2

You are required to study the performance of Hamming codes & Convolutional codes for binary symmetric channels. Specifically we would like to compare the (7,4) to the (15,11) Hamming codes with some basic convolutional codes. Our reference will be the un-coded case. Take the range of cross-over probability to be from 0 to 0.1 (*logspace*). You should get a similar plot (in addition to the convolutional performance $M=2$ or 3, rate= $1/2$, $1/3$).



Some of the command that you might need: *encode*, *decode*, *xor*, *semilogy*, *xlabel*, *ylabel*, *round*, *rand*, *randint*, *logspace*, *convenc*, *vitdec*, *xor*, *double*

Other interesting commands but might not be needed: *hammgen*

Major Steps:

1. Generate message with enough number of points.
2. Encode the message
3. For a specific value of p generate the error pattern.
4. Incorporate the error on the coded sequence
5. Decode
6. compare with original message and calculate the probability of error for the different codes
7. change p and goto 3
8. plot

Give your observations and comments (very important ,e.g. impact of code rate ...etc)

You may want to consider additional different codes and different dimensions

You need to submit a total of **no more than five pages** including the code and the plots. A hard copy should be submitted in the class on the due date and a soft copy (report+m-file) should be submitted through WebCT earlier.

Instructions:

1. Writing style and organization are very important (Quality not Quantity!)
2. **Your name and serial number should be clearly presented on the first page as well as on the code.**
3. **You should work** alone, submit one report.
4. You should make your output clear and nice. If you have plots, use commands like (*axis*, *xlabel*, *ylabel*, *title*, *legend*, *text*)
5. Remember to use (**help**, **lookfor**) commands.
6. Allow yourself enough time. Do not work close to the due date.
7. Projects are to be submitted during class time. Any late submission will result in zero or low grade.
8. You can use the discussion group in the Course WebCT to discuss general ideas and questions.
9. **Copying is the easiest way to loose points..** You should write the code yourself and be ready to answer any question related to it.

Good luck, **Dr. Ali Muqaibel**