EE 163
Communication Theory I

Winter 2003

http://ee163.caltech.edu

Communication System Analysis Project
Part 2: M-ary Phase Shift Keying

We will continue our investigation of phase shift keying systems by simulating an MPSK system, assuming the use of Gray coding, for $M = 2, 4, 8, 16$. Error probability range of interest is from $1 - \sim 10^{-5}$, corresponding to SNR from 0 $- \sim 20$ dB.

- Compute and plot the simulated and theoretical *symbol* error rate curves for these four systems in a single graph.

- Produce another similar graph for the probability of *bit* error. For the theoretical plots use the approximation given in Eq. 5.2-62 of your text. For what range of signal-to-noise ratios does the approximation hold well, and where does it fail? Why?

- Write your simulator in such a way so that you obtain the probability of a bit error and the probability of a symbol error at the same time and in one run, rather than in two separate runs.

- You may do this programming assignment by yourself, or in groups of 2. You can use either Matlab, or C/C++.

- Each individual or group should hand in a 1-2 page report that presents and discusses the results found. Please hand in (email) your source code as well, in one compressed file (zip or tar).