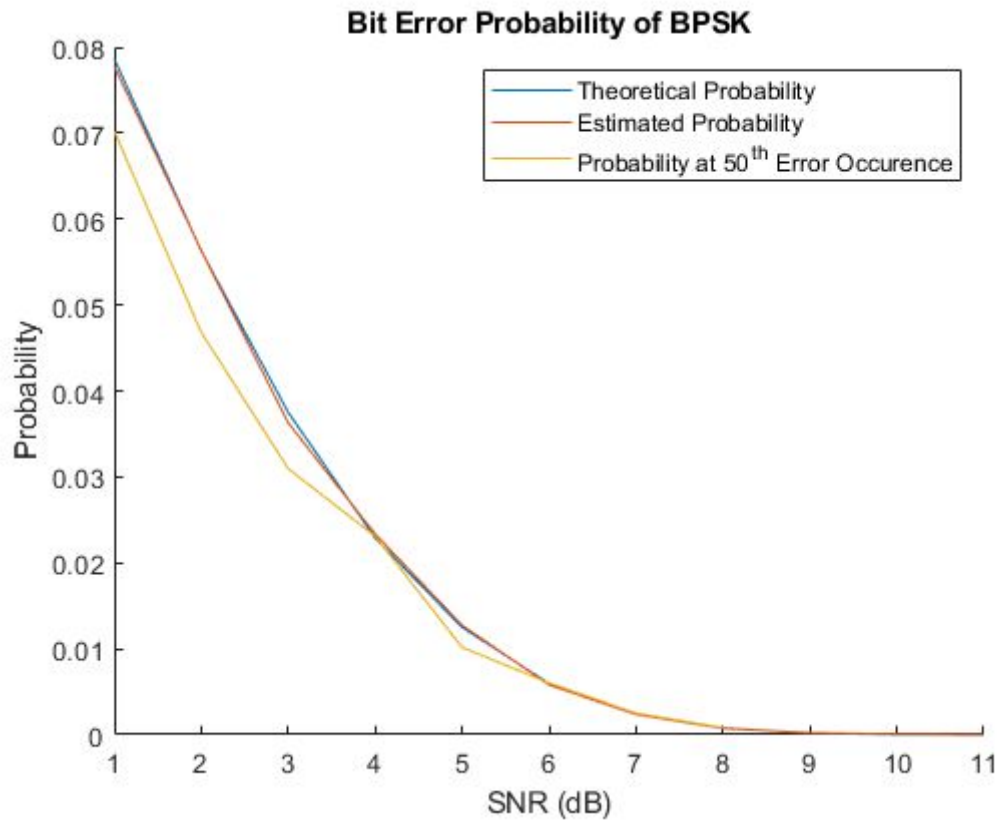


Sean O'Brien - 213 735 741  
EECS 4215: Mobile Communications  
Lab 3 - Modulation and Bit/Symbol Error Rate  
March 29th, 2018

1.

$$p_{BPSK}(e) = \frac{1}{2} \operatorname{erfc} \sqrt{\frac{E}{N_0}}$$



$$f_y(y|0) = \frac{1}{\sqrt{\pi N_0}} \cdot e^{-\frac{1}{N_0}(y+A)^2}$$

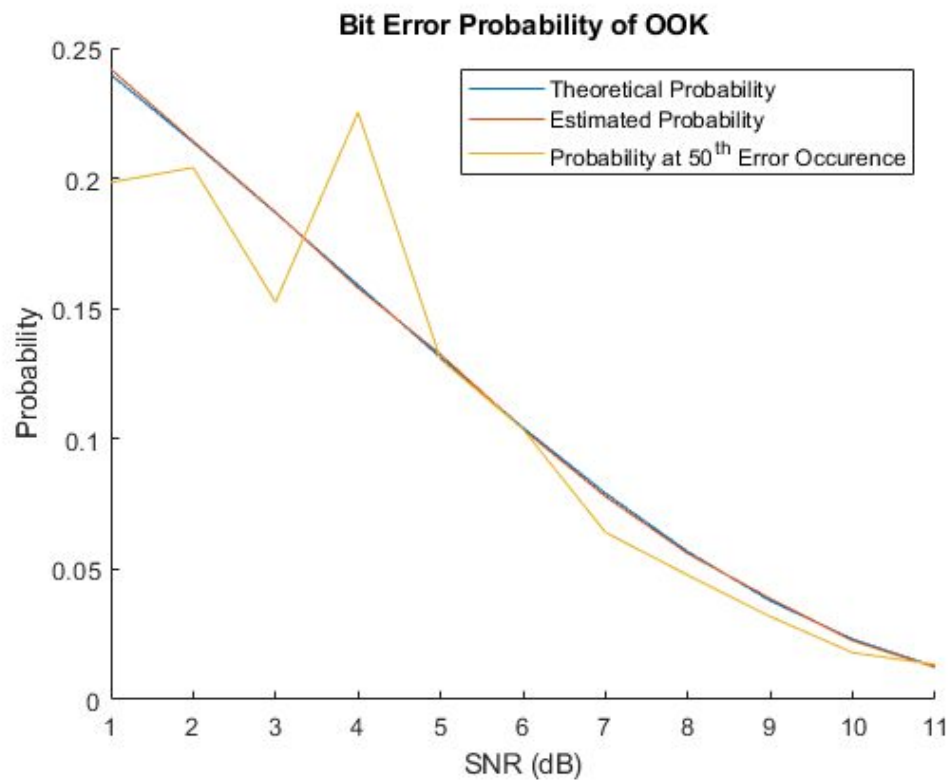
$$f_y(y|1) = \frac{1}{\sqrt{\pi N_0}} \cdot e^{-\frac{1}{N_0}(y-A)^2}$$

$$P_e = P(0) \int_0^{\infty} f_y(y|0) df + P(1) \int_0^{\infty} f_y(y|1) df$$

$$P_e = \frac{1}{\sqrt{\pi N_0}} \int_0^{\infty} e^{-\frac{1}{N_0}(y+A)^2} dy$$

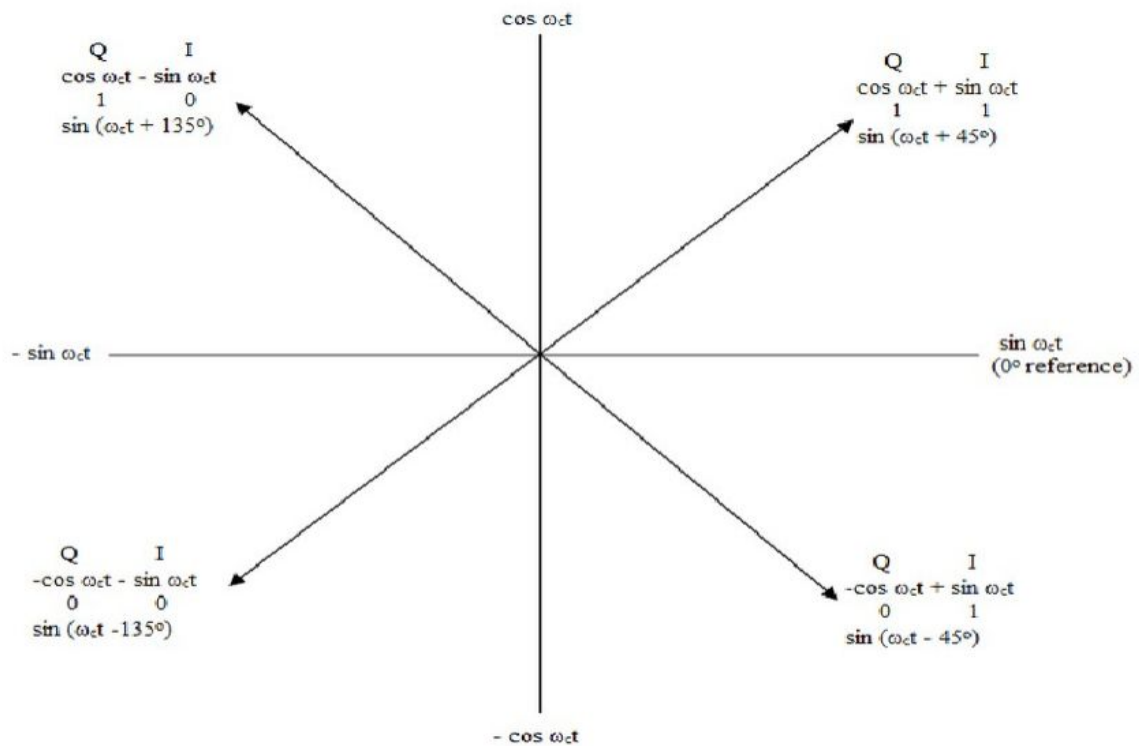
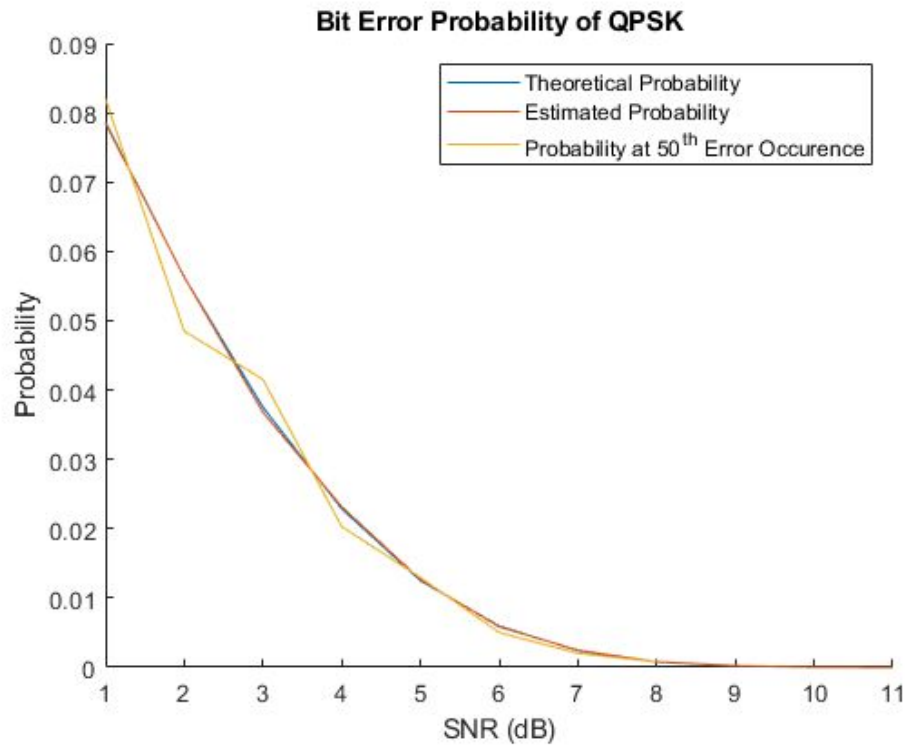
2. In binary phase shift keying, the decision making threshold is whether the received signal is greater than or less than zero. In on-off keying, the decision making threshold is whether the received signal is greater than or less than half of the transmitted bit energy.

$$p(e) = \frac{1}{2} \operatorname{erfc} \sqrt{\frac{E}{2N_0}}$$



3.

$$p_{QPSK}(e) = \frac{1}{2} \operatorname{erfc} \left( \sqrt{\frac{E}{N_0}} \right)$$



4.

