

# Communications Lab: Experiment 3

Bit error rate of Binary Phase Shift Keying (BPSK) in  
Additive White Gaussian Noise (AWGN)

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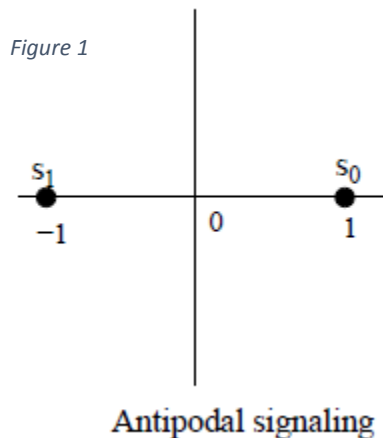
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## Introduction

The theoretical Bit Error Rate in BPSK modulation using an Antipodal signaling (fig 1) is given as

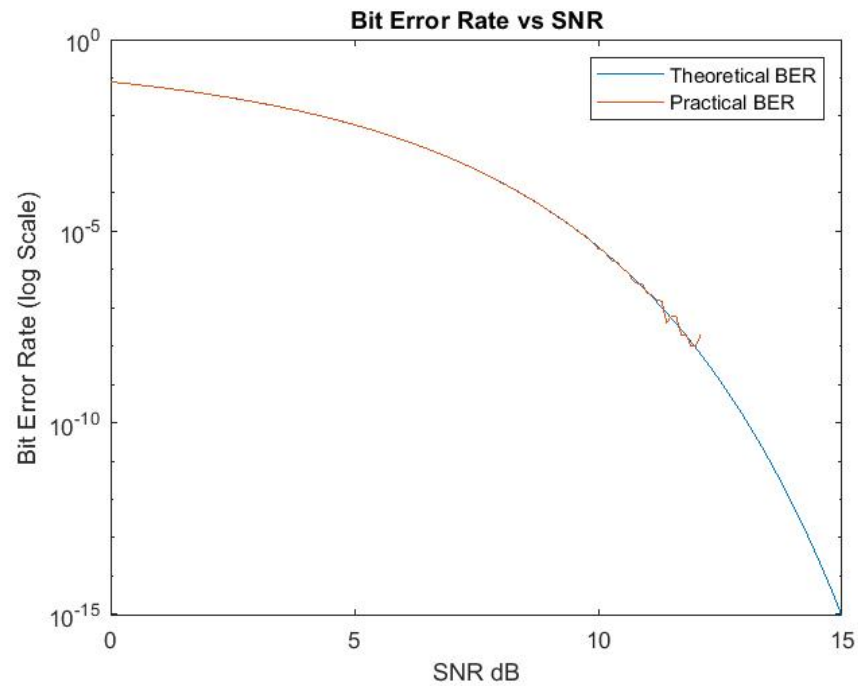
$$P_{e,ML} = Q\left(\sqrt{\frac{2E_b}{N_o}}\right)$$

Where  $SNR = \frac{E_b}{N_o}$



We now compute the BER vs SNR graph, by generating a random signal of 1,00,000 length containing bit 0 and bit 1. We compute BER for SNR values from 0dB to 15dB in steps of 0.1dB. Form computing the BER of each SNR value we take 1000 samples. The final result is presented below.

## Results



The above obtained results using MATLAB is matching with the results presented in the book "Introduction to Communication Systems, by Upamanyu Madhow". The result shown in the book is presented below

