Exam presentation
Assignment 2.2 and 2.3

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Q function 2.2

In this part of the assignment we will investigate the Normal (Gaussian) probability density function, $Q(u)$ function and it's relationship with complementary error function. It will also show how these theories will be related to the current communication systems by given assignment questions. Things we will look at are:

- Normal(Gaussian) Probability Density Function
- $Q(u)$ function
- $Q(u)$ function and it's relationship with complementary error function.

Probability Density Function

Normal distribution/Gaussian distribution is a really important and in fact most commonly used distribution in statistics. It is important because:

- Almost all variables are distributed approximately normally. They are approximately close
- Second reason is that statistical tests are derived from normal distribution and also work well if the distribution is approximately normal.
- Another reason is that it is only just characterised by two variables;
    - It's mean μ and and standard deviation σ

For the communication systems; Noise is an error or undesired random disturbance of a useful information in communication channel. The noise is a summation of unwanted or disturbing energy from natural and sometimes man-made sources.

Gaussian Noise

If we look at simple basic model for the net effect at the receiver of noise in the communication system is to assumed additive, Gaussian noise. In this model we have two signal components one is deterministic signal and the second component is the noise term, and is a quantity drawn from a Gaussian probability distribution with mean 0 and some variance and it is independent of the transmitted signal.

Q2.1 Plotting gaussian pdf and explain important variables

Now we can put our theory in a practice in this given question, we have created the MATLAB file named "graphingpdf.m which can be accessible from the report file. In this assignment important variables are

mu . This is the mean value (μ) for the normal probability density function.

sigma This the sensible standard deviation number. (σ).

MAX 50; Maximum x value that x vector will get

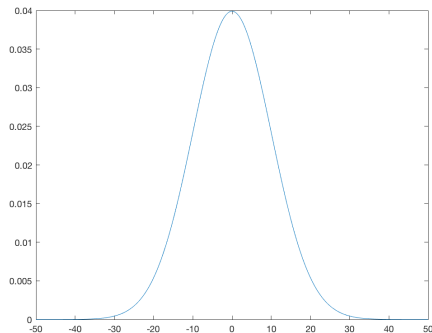MIN -50; Minimum x value that x vector will get

Graph for Gaussian PDF

Figure: Normal Gaussian pdf graph with defined intervals