1. Consider the signal defined as:
2. Write down the expression for the discrete signal obtained by sampling with period , namely .
3. If , with a positive integer, calculate the mean value of .
4. If , with a positive integer, calculate the variance of .
5. Calculate the mean and variance of when .

Solution:

1. The discrete signal can be written as:
2. The average is .
3. The variance of is given by:
4. The mean and variance of are:
5. Calculate the mean and variance of the following distributions:
   1. Binomial distribution with and .
   2. Poisson distribution with .
   3. Hypergeometic distribution with , , and .

Solution:

1. For a binomial distribution one have and thus and .
2. For a Poisson distribution .
3. For a hypergeometric distribution
4. Consider a normal distribution with and . Calculate the following probabilities:
   1. The random variable is located between and , namely .
   2. , , and .

Solution:

The normal distribution is given by:

The probability that the random variable is located between and is:

1. Use Matlab.
2. , , and .