**EASTERN MEDITERRANEAN UNIVERSITY**



**Department of Industrial Engineering**

**IENG514 Stochastic Processes and Applications**

**HOMEWORK 1 Fall 2019-20**

1. Let where *Ar* is a random variable with mean 0 and variance 1.
2. Find mean function.
3. Find covariance function
4. Discuss about stationary of this stochastic process.
5. Assume that *Z(t)* is a normal random variable with mean zero and variance , what we can say about the stationary of the following stochastic processes:
6.  where *k* is a constant
7. . Show that this process in martingale process.
8. Show that an independent and identical distribution sequence of continuous random variable with common density function is strictly stationary.
9. Show that where *X(t)* is an independent and identical distribution process of continuous random variable is a stationary stochastic process.
10. Let , where *Ar* and *Br* are uncorrelated random variables with mean zero and variance , and are constants. Show that is covariance stationary. Show that this process cannot be a Markov chain.
11. Consider the process whose probability distribution under certain condition, is given by



Show that the process is not a stationery process.

1. Let *{Zi, i=1,2,…}* be a sequence of i.i.d random variables with *E[Zi]=1* and let . Then show that *{Xn, n1}* is a martingale.
2. Let U1, U2,… be independent random variables each having uniform distribution in (0,1). Let , show that *{Xn, n1}* is a martingale.