ASSIGNMENT II
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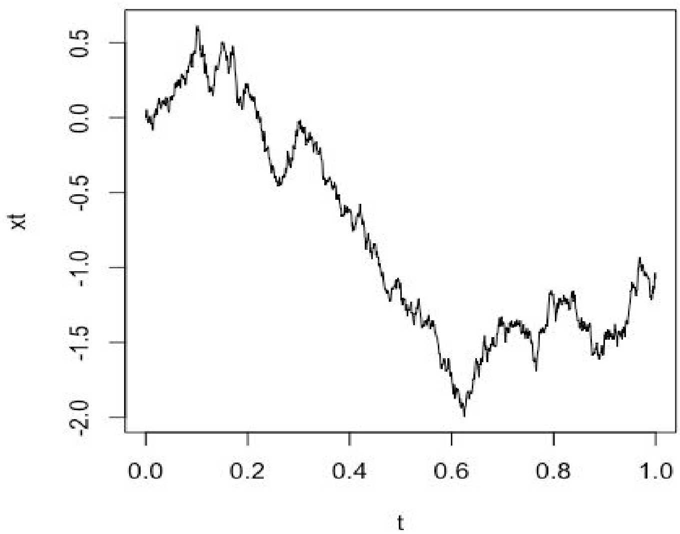
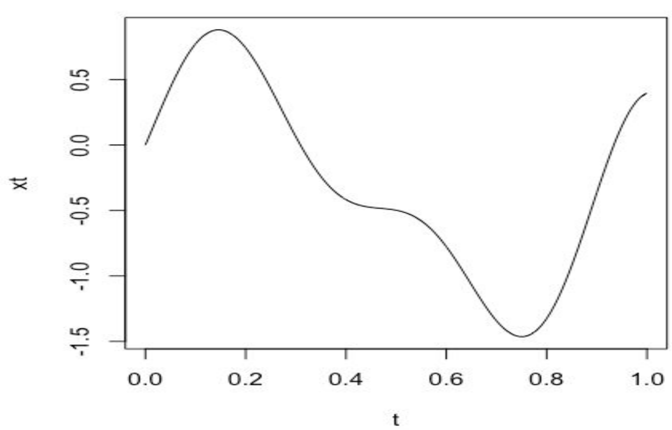
Question 1

Seq function used to generate a sequence of epochs. m denotes the number of epochs or arrivals which is set randomly to a value of suppose 1000. Sigma is the covariance matrix which is generated using the sapply function that returns a matrix structure.Then finally a Gaussian process is simulated using MASS libraries mvrnorm function since it's for multivariate normal we take 1 as we need univariate distribution but by default it is 1. We finally plot Xt vs t.

Wiener Process with K= min(s,t)
Kernel produced by this process is continuous but not differentiable.



Part a
Gaussian Process with K = exp(-16*(s-t)**2)
Kernel Produced by this Process is both continuous and differentiable.



Question 2

Symmetric Random Walk with Absorbing Boundaries

gambler wins $1 with probability (p) and loses $1 with a probability of (1-p) where p is chosen at random. This process is continued until the money he has reached an amount of $20. So we simulate a random walk for this process till the money is >0 and <20 and see if the coin toss has a probability of 1 then we increase the amount of money gambler has by $1 else reduce it by $1. Storing the states in an array we finally plot the array vs index which is shown below.
States at each iteration

[1] 9 10 11 10 11 10 11 12 13 12 11 12 11 12 11 12 11 10 9 8 9 10 11 10 9 10 11 10 11 10 11 10
[33] 11 10 11 12 13 12 11 10 9 8 9 10 11 12 11 10 9 10 11 10 9 8 9 10 9 10 11 12 13 12 11 12
[65] 13 14 15 14 13 14 15 16 15 14 13 14 15 14 13 14 13 14 15 14 15 14 15 14 13 12 13 12 13 14 15 14
[97] 15 14 15 14 13 14 15 16 17 16 15 14 13 14 13 14 13 12 13 14 13 12 13 12 13 14 15 16 17 18 19 20