SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution) Coimbatore – 641 035 DEPARTMENT OF MATHEMATICS RANDOM PROCESSES, WIDE SENSE STATIONARY PROCESS



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1. Show that the Process x(t)=Acocat+BSPn At
  & wss, where A&B are landom vousables, 97
  1). E[A] = E[B] = 0
  ii) E[Aª] = E[Bª] #
 iii). E[AB] = 0
win. Givn. X(t) = A cos At + B sin At
in E[x(t)] = E[A Coc At + B S9n At7
            = Cosat E[A] + 39n at E[B]
            = Cos at Co) + San at (o) [= E(A) = E(B) = 0]
ii) E[x(t)x(t+t)] = E[(Acos)++BS90 At)
                         (A cosalt+t) + B s9n a (++t))
 = E (A cos At + B S9n At) (A cos (At+AT) + B S9n (At+AT)
 = E [ A cos at cos(At+AT) + AB cos at sin (At+AT)
        + BA Sindt Cos(at+AT) + Ba Sindt Sin(at+aT)7
 = E[AB cos At cos(At+AT)] + E[AB cos At SAN(At+AT)]
      + E[BA SAN At COS(At+AT)] + E[BS SAN AT BAN(AT+AT)]
 = \cos \partial \pm \cos(\partial \pm + \partial \tau) E(A^2) + \cos \partial \pm S9n(\partial \pm + \partial \tau) E(AB)
      + SAN At COS(At+AT) E(BA) + SAN At SAN (At+AT) E(BB)
 = cos At cos (At+AT) K + cos At S9n (A++AT)(0)
     + SIN At COS(At+AT) (O) + SIN At SIN(At+AT)(K)
                              [: E(A^2) = E(B^2) = K(Say)]
 = K [ cos at cos ( at + a t) + 39n at 39n ( at + a t) ]
 = K [ cos(At-(At+AT))] : cos A cos B + SPA SPA B
 = th [cos(-AT)] = co.
= K cos(AT) which depends on to
                                = \cos (A - B)
  = Rxx (2)
                          . x [t] is wss.
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