Assignment-4

AI1110: Probability And Random Variables
IIT Hyderabad

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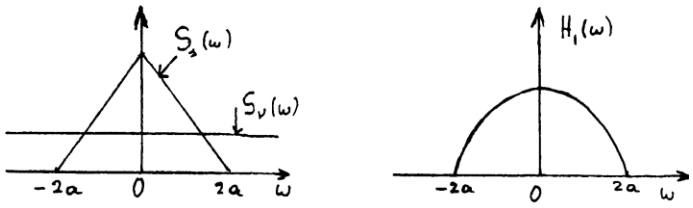
Q Papaulis 13.8;Find the noncausal estimators H1(ω) and $H2(\omega)$ respectively of a process s(t) and its derivative s'(t) in terms of the data s(t) = s(t) + v(t) where
$Rs(\tau) = A\frac{sin^2a\tau}{\tau^2}Rv(\tau) = N\delta(\tau) = 0$(1)

Solution:-*The fourier transform Ss(ω) $of the$ function,*$Rs(\tau) = A\frac{sin^2a\tau}{\tau^2}Rv(\tau)$ $is\ a\ triangle$



and since Sv(ω) $= N, yields$

H1(ω) $= \frac{Ss(\omega)}{Ss(\omega)+Sv(\omega)}$

= $Aa\pi(1-\omega/2a)\frac{}{Aa\pi(1-\omega a)+N}$
we show next that H2(ω) $= j\omega H1(\omega)$.