TV

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Matlab sample 2

Solution 1:- Derivation of Theoretical Probability density function of Rayleigh distribution is given by-

We know,

R is Rayleigh distributed if



Where, and  are independent normally distributed

Considering above as two dimension vector, 

Thus,

 and 

And 

Converting above into polar coordinate



Hence, on solving above we get



is the pdf of Rayleigh distribution

and also for cumulative distribution we have,



On integrating we get



**PLOT USING MATLAB**

**(i)** Theoretical pdf(Probability density function) of Rayleigh distribution

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**(ii)** Theoretical cdf(cumulative density function) of Rayleigh distribution

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Solution 2:-

The Rayleigh function based on jakes model is implemented as a function

function [R]=rayleighFading\_jake(N,fd,fs,to)

where

N- Number of sinusoid

fd- Doppler frequency

fs-sampling frequency

to-Initial time

(i) For Doppler shift of 10 Hz, i have calculated using-

[R]=rayleighFading\_jake(8,10,10000,0);



(ii) For Doppler shift of 100 Hz, i have calculated using-

[R]=rayleighFading\_jake(8,100,10000,0);



(iii) For Doppler shift of 1000 Hz, i have calculated using-

[R]=rayleighFading\_jake(8,1000,10000,0);



(iv) comparison of simulated pdf and theoretical pdf (for doppler shift =10 Hz)



**Comments**:-

The simulated pdf is in close argument with theoretical pdf. The samples generated by Jake’s model follows Rayleigh distribution (with variance = 0.7)