

Statistical Modeling of Mobile Fading Channels Based on Triply Stochastic Filtered Marked Poisson Point Processes

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Abstract : Understanding the statistics of non-isotropic scattering multipath channels that fade randomly with respect to time, frequency, and space in a mobile environment is very crucial for the accurate detection of received signals in wireless and cellular communication systems. In this paper, we derive stochastic models for the probability density function (PDF) of the shift in the carrier frequency caused by the Doppler Effect on the received illuminating signal in the presence of a dominant line of sight. Our derivation is based on a generalized Clarke's and a two-wave partially developed scattering models, where the statistical distribution of the frequency shift is shown to be consistent with the power spectral density of the Doppler shifted signal.

Keywords : Doppler shift, filtered Poisson process, generalized Clark's model, non-isotropic scattering, partially developed scattering, Rician distribution

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