

CLOSED FORM BER EXPRESSIONS FOR BPSK OFDM SYSTEMS OVER FREQUENCY SELECTIVE FADING CHANNELS

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ABSTRACT. Few exact bit error rate (BER) expressions are known about the OFDM systems impaired with carrier frequency offset (CFO) and Doppler spreading in multipath fading environment. The CFO and Doppler spreading spill the useful energy of a particular subcarrier over the other carriers and hence introduce inter-carrier interference (ICI). In this paper, we derive exact closed form BER expressions for OFDM systems either with CFO or ICI due to Doppler spreading over frequency selective Rayleigh fading channel. We show that the ICI has a probability density function of mixture of Gaussian densities for classical binary phase shift keying (BPSK) modulation scheme. Our results can easily be reduced to the respective analytical error rate expressions for the OFDM systems with or without CFO error over frequency flat fading channels. Furthermore, simulation results are provided to verify the accuracy of the new error rate expressions.