Recovering Weak Signal using Nakagami Fading Wireless Channel with Multiuser Diversity

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Abstract: - Propagation of new wireless technologies has regenerated an interest on the digital modulation system, analysis and implementation of suboptimal receiver designs that provide poor performance when the order of diversity is large. In this proposed system propose a new creation for causing the Nakagami Fading channel(NFC) which possess random and different fading figure *m* for each sub channel with Multiuser diversity is used to producing an acceptable average Signal to Noise Ratio(SNR) and best statistical reducing outage probability(P_{out}) or Bit Error Rate (BER) of multipath fading effect. The diversity is produced by the depolarization of the transmitted signal by reflection, diffraction, and scattering in the channel of Nakagami Fading channels. The result of this proposed system, a novel simple and high efficient generation method is developed to scrutinize an excellent accuracy in wireless media.

Key-Words: - **Multipath Fading; Nakagami Fading Channel; Fading Figure; Multiuser Diversity; Outage Probability**

1 Introduction

The wireless revolution was triggered and is being sustained by several important factors are advances in microelectronics, high-speed intelligent networks, positive user response and an encouraging regulatory climate worldwide. The largest obstacle facing designers of wireless communications systems is the nature of the propagation channel [1].

The wireless channel is non-stationary and typically very noisy due to fading and interference, while the most common type of fading is caused by multipath effects, in which multiple copies of a signal arrive out of phase at the receiver and destructively interfere with the desired signal. Although there are a large number of papers dealing with performance analysis of digital modulation with carrier frequency offset, the fading channels are all assumed Rayleigh distributed. However, another well-known channel statistical model called the Nakagami distribution, has been shown to be a more versatile model for such as urban, suburban radio multipath channel in wireless communication systems and Rician fading is just a special case, where the fading figure $m = 1$. The objective of this paper is to evaluate in Nakagami fading channels for $m > 1$, the performance of wireless transceiver system with carrier frequency offset and to explore the effect of imperfect channel fading estimation.

Diversity, where signal replicas are obtained through the use of either temporal, frequency, spatial or, polarization spacing is an effective technique to mitigate the multipath fading. There are three prevalent diversity combining techniques: Selection Combining (SC), Equal Gain Combining (EGC) and Maximal Ratio Combining (MRC). MRC weights the signals from different paths according to their respective SNRs and then takes their sum. Compared to the other two schemes, MRC has significantly better performance than SC and EGC [8].

The existing system, performance of transmission modes are evaluated by calculating the probability of Bit Error Rate (BER) versus the Signal Noise Ratio (SNR) under the frequently used three wireless channel models are AWGN, Rayleigh and Rician. Simulation of wireless channels accurately is very important for the design and performance evaluation of wireless

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