



Research Article



Multuser Detection in Shadowed Fading Channels with Impulsive Noise

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ABSTRACT

In direct sequence-code division multiple accesses systems (DS-CDMA), the signals are transmitted over multipath channels that introduce fading. Multipath

fading along with multiple access interference and inter-symbol interference degrades the system performance. Further, simultaneous presence of multipath fading and shadowing leads to worsening of wireless channels. Moreover, experimental results have confirmed the presence of impulsive noise in wireless mobile communication channels. Hence, this paper presents a technique for multuser detection in DS-CDMA systems over shadowed fading channels in presence of impulsive noise. Approximate expression for average probability of error of an M-decorrelator is derived, for the demodulation of binary phase shift keying (BPSK) signals over shadowed fading channels, by modeling the channel with generalized K (GK) distribution. A new M-estimator is proposed for robustifying the detector and its performance is also studied and analyzed by evaluating probability of error with the derived expression. Simulation results reveal that the proposed multuser detector performs better in fading and shadowing with heavy-tailed impulsive noise.

Keywords: Multuser detection; fading channel; impulsive noise; GK distribution; probability of error.

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