



Research Article



Multiuser Detection using Particle Swarm Optimization over GK Fading Channels in Laplace Noise

Srinivasa Rao Vempati ¹, Habibulla Khan ² and Anil Kumar Tipparti ³

Corresponding Author:

tvakumar2000@yahoo.co.in

DOI:

[http://dx.doi.org/
10.17812/IJRA.2.6\(55\)2015](http://dx.doi.org/10.17812/IJRA.2.6(55)2015)

Manuscript:

Received: 1st May, 2015

Accepted: 31th May, 2015

Published: 20th June, 2015

Publisher:

Global Science Publishing
Group, USA

<http://www.globalsciencepg.org/>

ABSTRACT

The direct sequence-code division multiple accesses (DS-CDMA) signals are

transmitted over multipath channels that introduce fading and shadowing. Combined effect of multipath fading and shadowing along with multiple access interference (MAI) and inter-symbol interference (ISI) worsens the system performance. Further, experimental results have confirmed the presence of impulsive noise in wireless mobile communication channels. Hence, this paper presents a particle swarm optimization (PSO) based multiuser detection technique for DS-CDMA systems over generalized-K (GK) fading channels in presence of impulsive noise modeled by Laplace distribution. Maximal ratio combining (MRC) receive diversity is also incorporated to mitigate the effects of fading and shadowing. Performance of proposed M -estimator based detector is also studied by evaluating average error rate. Simulation results reveal that the proposed M -estimator based detector performs better in the presence of fading, shadowing and heavy-tailed impulsive noise when compared to least squares, Huber and Hampel M -estimator based detectors.

Keyword: diversity combining, fading channel, GK distribution, Laplace noise, multiuser detection, probability of error, particle swarm optimization, shadowing.

^{1,2,3}Department of ECE, ¹KITS for Women, Kodad, India – 508206,

²KL University, Vaddeswaram, India- 522502, ³SR Engineering College, Warangal, India- 506 371.

IJRA - Year of 2015 Transactions:

Month: April - June

Volume – 2, Issue – 6, Page No's:314-320

Subject Stream: Electronics

Paper Communication: Through Conference of ICETET-2015

Paper Reference Id: IJRA-2015: 2(6)314-320