ESTIMATION OF THE SNR FOR WIRELESS SYSTEMS IN A LOCAL FADING ENVIRONMENT WITH MULTI−ELEMENT ANTENNAS (MonPmPO1)

Author(s) : Jean−Pierre Dubois (University of Balamand, Lebanon)

Abstract :

Estimation techniques for the signal−to−noise ratio play an increasingly vital role in the effective operation of wireless communication systems. This paper presents stochastic models and estimation algorithms for the average received signal−to−interference−noise ratio (SINR) in local fading area channels with a finite random number of scatterers for wireless single−input−single−output (SISO) and multiple−input−multiple−output (MIMO) systems. The stochastic models for the SINR are based on a doubly stochastic filtered compound Poisson point process. For each of these statistical models, we present optimal and computationally efficient estimation algorithms to determine the average SINR using received diffuse power measurements. We show that the maximum likelihood estimator is optimal in the sense that the variance of the error is the smallest possible using any other conceivable estimate having the same bias with the same data. Efficient estimation of the SINR also allows accurate quantification of the bit error rate and average channel capacity for adequate quality of service (QoS) and network link resource allocation.

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