

APPLICATIONS OF FUZZY LOGIC FOR ADAPTIVE INTERFERENCE CANCELLER IN CDMA WIRELESS COMMUNICATION SYSTEMS

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ABSTRACT. *In this paper, the performance of the proposed fuzzy logic parallel interference cancellation (FLPIC) multiuser detector is evaluated for frequency-selective fading channels in wireless CDMA communication systems. A modified fuzzy logic system (FLS) with an adequate scaling factor (SF) is proposed to infer adequate partial factors (PFs) for the PIC scheme. Simulation results show that the proposed FLS can adapt to the large variations of users' fading effects; the FLPIC thus outperforms the conventional PIC (CPIC) and constant-weight PIC (CWPIC) over two-path and three-path time-varying frequency-selective fading channels, especially at heavy system load in DS-CDMA systems.*

Keywords: DS-CDMA, Frequency-selective fading, Partial parallel interference cancellation, Fuzzy logic system

1. Introduction. The DS-CDMA cellular communication system, the most favorite candidate for the 3rd generation radio cellular communication systems, exhibits a highly potential capacity. However, the two main shortcomings in a CDMA system, the multiple access interference (MAI) and the near-far problem degrade the system performance [1-3]. The multiuser detector, an upcoming main-stream research for CDMA receivers, which attempts to eliminate MAIs and the near-far problem simultaneously, has become an approved capacity improving technique and received much significant attention recently [2-5]. The initial work on multiuser detection for CDMA is the optimal multiuser detector proposed by Verdu [2], which has a potential improvement in capacity and near-far resistance. However, the computational complexity of the optimal maximum likelihood