Channel Equalizers for DS-CDMA Systems in Radio Fading Channel

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ABSTRACT

The performance of DS-CDMA systems equipped with cyclic prefix and equalizers, transversal and decision feedback equalizers, equipped with the proposed RAKE equalizer is investigated based on simulations, and the results is compared with the simple RAKE receivers. Two type pf multipath channel, namely Rayleigh fading and non-fading channel are considered in this thesis. According to the simulation results. We find that both inter-chip (ICI) and inter-symbol interference (ISI) can not be effectively removed without cyclic prefix. When the cyclic prefix is added, the inter-symbol interference is removed and the performance of equalizers is improved accordingly. In Rayleigh fading channels, the effect of the ISI and ICI is reduced, but the fading effect can not be mitigated without diversity schemes. Consequently the performance of equalization with cyclic prefix is worst than that of the pure RAKE receiver. However, the proposed RAKE equalizer is not only able to remove ISI and ICI, but also provide good diversity. As a result compared to the performance of RAKE receiver, the RAKE equalizer provides a performance gain of 2.3 and 1.7 dB for a performance gain of 16 and 8, respectively.

Keywords : CDMA ; RAKE receiver ; Equalizer ; Cyclic prefix ; RAKE Equalizer

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