شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

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التوثيق الالكتروني والميكروفيلم

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JOINT DETECTION AND DIVERSITY TECHNIQUES IN CDMA MOBILE RADIO SYSTEMS

by

Ahmad Saad Mohamed Harmal

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
ELECTRONICS AND COMMUNICATIONS

Under the Supervision of

Prof. Dr. Emad K. Al-Hussaini

Dr. Hebatallah M. Mourad

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Abstract

CDMA mobile radio systems suffer from intersymbol interference (ISI) and multiple access interference (MAI) which can be combated by using joint detection (JD) techniques. Furthermore, the time variation of the radio channels leads to degradations of the receiver performance due to fading. These degradations can be reduced by applying diversity techniques. Three suboptimum detection techniques based on matched filters (MF), zero forcing (ZF) and minimum mean square-error (MMSE) equalization are considered. For further improvements, switched diversity and equal gain diversity techniques are employed to combat fading. The performance is depicted in terms of the average bit error probability versus the average SNR per bit in a single cell environment showing an appreciable improvement. Theoretical results for the SNR at the front end of the receiver and the BER for ideal channel are obtained and compared with the simulation results.

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Table of contents