AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING
Electronics and Communications Engineering Department

Resource Allocation in 3G Wideband CDMA Systems

A Thesis
Submitted in partial fulfillment of the requirements of the degree of
Master of Science in Electrical Engineering

Submitted by

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STATEMENT

This dissertation is submitted to Ain Shams University for the degree of Master of Science in Electrical Engineering (Electronics and Communications Engineering).

The work included in this thesis was carried out by the author at the Electronics and Communications Engineering Department, Faculty of Engineering, Ain Shams University, Cairo, Egypt.

No part of this thesis was submitted for a degree or a qualification at any other university or institution.

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Abstract

Resource Allocation in 3G Wideband CDMA Systems

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Mobile communication has grown tremendously over the last two decades. The percentage of calls from mobile to mobile calls has exceeded all the expectations by all Mobile operators. Modern mobile communication systems will provide enhanced high-speed data, multimedia, and voice services to mobile users. In this work we propose a resource allocation and management scheme tailored for a networks supporting heterogeneous user mix.

In a system with data and multimedia users, Users are elastic in their demands for bandwidth. In this work, we propose a resource allocation and management scheme tailored for systems having heterogeneous users. The algorithm works by checking the SINR in the cell where a minimum E_b/I_o has to be exceeded for all users in the system before taking the decision of accepting or rejecting a new user in the system.

In this thesis, elasticity of user requiring data services is exploited. Users don't necessarily have their maximum requested data rate, users can accept a minimum data rate for the connection instead of being blocked from the cell due to extra interference introduced by their connection at maximum data rate.

In this thesis, a resource allocation algorithm was initially introduced and through the simulation results, the amount of improvement in the systems in terms of subscribers' satisfaction and through the increase in call setup success rate which resulted from decreasing number of blocked calls was clearly shown.

A modified resource management algorithm was then introduced which showed much more improvement in system performance compared with the primary algorithm. It was shown that a system with resource management system is far exceeding the unmanaged system in terms of call setup success rate and consequently subscribers' satisfaction.

TABLE OF CONTENTS

LIST OF FIGURES