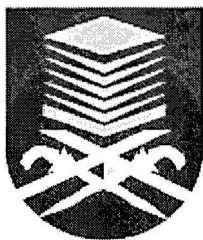


**MULTIUSER-MIMO TRANSMISSION USING  
DIRTY PAPER CODING**

**This is presented in partial fulfillment for the award of the  
Bachelor of Engineering (Hons) Electronics (Communication)  
Universiti Teknologi MARA**



**NIK NURUL AZUIN BT NIK ABDUL RAHMAN  
FACULTY OF ELECTRICAL ENGINEERING  
UNIVERSITI TEKNOLOGI MARA  
40450 SHAH ALAM,  
SELANGOR, MALAYSIA**

## ACKNOWLEDGEMENT

Assalamualaikum w.b.t

First of all, i would like to thanks Allah SWT because His blessing and kindness has given me strength to give my best in completing my Final Year Project (FYP) 2, Alhamdulillah.

I would like to express my gratitude and appreciation to those who helped me directly or indirectly in completing this research. I would like to dedicate my deepest appreciation to my project supervisor Dr Nur Idora Bt Abdul Razak, who has giving me advice, guideline, motivation, and assist me during this two semester. She really support me all the times and also guide me completing this research. I would like to express my deepest gratitude to her for all the patience with me.

Moreover, i would like to thank all of my lecturers who have taught me and giving me a lot of knowledge form social life to engineering life. Without all kind of support,i won't be able to completely this research.

My special thanks to my mother and family for their love, support and prayer for my health and success. Beside that, lots of thank to all my friend and colleagues who always understand and being with me through hard time. Those whose name might been accidentally left out, i would like to be humble apologies as well as sincere thanks for their invaluable contribution. Last, thanks to Faculty of Electrical Engineering, Universiti Teknologi Mara (UiTM) and all the student had participated and supporting the research.

## **ABSTRACT**

This paper describes the performance of Multiuser-MIMO transmission using Dirty Paper Coding (DPC) in term of bit error rate (BER) versus signal-to-noise ratio (SNR). The performance of this transmission is compared under different scenarios which are different of users and transmit antenna and comparing with other technique, Block Diagonalization by using MATLAB's simulation.

Keywords- MIMO, DPC, SNR, BER

## TABLE OF CONTENTS

<b>TITLE</b>	<b>PAGE</b>
<b>APPROVAL</b>	
<b>DECLARATION</b>	ii
<b>DEDICATION</b>	iii
<b>ACKNOWLEDGEMENT</b>	iv
<b>ABSTRACT</b>	v
<b>TABLE OF CONTENTS</b>	vi
<b>LIST OF FIGURES</b>	ix
<b>LIST OF TABLES</b>	ix
<b>LIST OF ABBREVIATIONS</b>	x
<b>CHAPTER 1: INTRODUCTION</b>	
1.1 BACKGROUND OF STUDY	
1.1.1 MULTIPLE INPUT MULTIPLE OUTPUT (MIMO)	3
1.1.2 PRE-CODING FOR MULTI-USER MIMO	6
1.1.3 DIRTY PAPER CODING (DPC)	7
1.2 PROBLEM STATEMENT	9
1.3 OBJECTIVE	10
1.4 SCOPE OF WORK	10
1.5 THESIS ORGANIZATION	11
<b>CHAPTER 2: LITERATURE REVIEWS</b>	12
2.1 MULTIPLE INPUT MULTIPLE OUTPUT (MIMO)	12
2.2 DIRTY PAPER CODING (DPC)	22
<b>CHAPTER 3: METHODOLOGY</b>	26
3.1 FLOW CHART	26
3.2 ALGORITHM FOR DIRTY PAPER CODING	28
	34

# **CHAPTER 1**

## **INTRODUCTION**

A project background or overview about the project will be described in this chapter. Basically, the appropriate technique that have been used in the project and the expected overall performance using the technique will be explained. In this chapter, it will also state the problem statement. Hence, the peroblem will be come up with a suitable objective. Finally, the scope of work and the organization of the project report will also be explained.

### **1.1 BACKGROUND OF STUDY**

In a multiuser MIMO (MU-MIMO) system, a base station communicates with multiple users. On the downlink, known as the MIMO broadcast channel, the base station sends different information streams to the users. On the uplink, the base station receives different information from the users. Other variations of MU-MIMO involve full or partial multi-cast of data. Note that while MU-MIMO is often discussed in the context of cellular communication, it could conceivably be used in wireless local area networks.