

CHAPTER 60
TECHNOLOGY
ELECTRONICS & COMMUNICATION
ENGINEERING

Doctoral Theses

649. JASPAL KUMAR

Some Studies on Routing Techniques for Ad-Hoc Networks

Supervisors : Prof. Muralidhar Kulkarni, Prof. Daya Gupta and Associate Prof. S. Indu

Th 22622

Contents

1. Introduction 2. Literature survey 3. performance comparison of routing protocols in manets 4. Optimized power efficient routing in ad-hoc networks (OPERA) 5. Methodologies to detect and prevent black-hole attack in aodv protocol 6. Overall conclusions and future scope. Publications and references.

650. PURI (Parul)

Free Space Optics: Performance Evaluation of Diversity Techniques.

Supervisor : Prof. Parul Garg

Th 22623

Abstract

Free space optics (FSO) has emerged as one of the most promising technologies for high data-rate communication. At the same time, the FSO technology faces challenges due to the atmospheric channel through which the laser beam propagates. In this thesis, we overcome these challenges by applying spatial diversity techniques. In particular, we utilize a two-way relay (TWR) to establish bi-directional communication link between two distant nodes. The TWR helps to increase the coverage area of the FSO transmission and also mitigates the distance-dependent fading effects. In our analysis, we explore various applications of TWR assisted FSO communication and present a mathematical framework for the physical layer performance metrics, such as signal-to-noise ratio (SNR), outage probability, average error probability, and achievable capacity. In the first application, we address a basic TWR assisted FSO link between two users. Considering that a direct link is not present between the two users, a common TWR is used to establish a bi-directional communication link between them. We present a performance analysis of the considered system to demonstrate the effectiveness of TWR assisted FSO communication. In the second application, we extend the concept of TWR protocols to a multiuser scenario, in which multiple user-pairs need to exchange data among them. We use a single TWR that serves the multiple user-pairs by employing a scheduler.

We compare the performance of three types of schedulers based on absolute SNR, normalized SNR, and selective multiuser diversity. Furthermore, we address parallel relayed FSO systems, which consist of two terminal nodes and multiple TWRs. The parallel relayed FSO systems help to create a virtual multiple input multiple output (MIMO) system that provides spatial diversity gain. For such systems, we present various relay selection protocols to select single or dual relays that participate in the communication process.

Contents

1. Introduction 2. Two-way relay assisted FSO links between two users 3. Multiple user-pair scheduling in TWR-FSO networks 4. Relay selection based on instantaneous SNR for parallel TWR-FSO networks 5. Relay selection based on achievable sum-rate for parallel TWR-FSO networks 6. Partial dual-relay selection protocols for multiple relayed FSO systems 7. Conclusion and future works. Appendix and bibliography.

651. SINGH (Kunwar)
Design and Optimization of Digital CMOS Integrated Circuits for Minimum Power-Delay-Area Product.
Supervisor : Prof. Maneesha Gupta
Th 22587

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1. Introduction 2. Overview of underlying concepts, technology calibration and simulation parameters 3. Implementation of master- slave flip-flops based on a novel circuit topology 4. Optimization of CMOS logic circuits for minimum PDAP using LE theory and LM Algorithm 5. Automated transistor sizing of CMOS logic circuits using LE theory and GA for minimum PDAP 6. Next generation logic synthesis approach based on LE theory and neural networks 7. Conclusions and suggestions for future work. Technology calibration at 130 nm CMOS process using PTM technology parameters. Publications based on this thesis and technical biography of author.

652. SINGH (Urvashi)
Analog Integrated Circuit Design Employing Different Bndwidth Extension Techniques.
Supervisor : Prof. Maneesha Gupta
Th 22350

Contents

1. Introduction 2. Basics of the bandwidth extension techniques and analog circuits used in the thesis 3. Bandwidth extension of flipped voltage follower by using resistive compensation technique 4. Bandwidth extension of flipped voltage follower by using inductive peaking technique 5. Bandwidth extension of fgmos based super source follower by using resistive compensation technique 6. Bandwth extension of regulated cascode amplifier by using split-length compensation technique 7. Conclusions and suggestions for further work. References. List of Publications. Appendices.

653. SRIVASTAVA (Richa)

Design of Low Voltage/Low Power Analog Signal Processing Circuits.

Supervisor : Prof. Maneesha Gupta

Th 22351

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1. Introduction 2. Fgmos based voltage squarers and four-quadrant multiplier 3. Fgmos transistor based low voltage and low power fully programmable gaussian function generator 4. Low voltage fgmos squarer/divider based analog building blocks 5. Fgmos based voltage differencing inverting buffered amplifier and its application as universal filter 6. Low voltage high performance fgmos based wilson current mirror 7. Conclusions and suggestions for further work. References, list of publications and appendices.