UNIVERSITY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF ELECTRICAL ENGINEERING

MSC. THESIS TOPIC PROPOSAL

Modeling and Simulation of Magnetic Transmission Lines

Name of Student: Muhammad Shamaas

Registration No: 2018-MS-EE-4

Problem Statement

Magnetic Transmission Line is the dual counterpart of Electric Transmission Line. Its theory, encompasses a diverse range of applications including Transformers, Dynamic Machines, Microwave Generators, Tuners, Couplers, Isolators, Power Dividers etc. Intrinsically, Magnetic Transmission Line is made from a non-conducting magnetic material, with a high permeability. It conducts Magnetic Flux which acts as the Magnetic charge. Time varying magnetic flux results in a Magnetic Displacement Current inside the Transmission Line, which has the units of Volts. This produces a gradient Magnetic Field; with Fields Lines that spread radially outwards. The magnetic voltage due to this Magnetic Field is measured in Amperes. Although, the operation of a Magnetic Transmission Line does not involve electric charges, Magnetic Displacement Current produces an Electric Field with closed Field Lines encircling the Magnetic Transmission Line. Together, the Electric and Magnetic Fields transmit Energy along the direction of propagation. These relations will be modeled using Maxwell's Equations and magnetic circuits to study the time and frequency domain behavior of Magnetic Transmission Lines. Furthermore, Finite Difference Time Domain Electromagnetic Field Simulations will be carried out in MEEP [6] Simulator for anisotropic, inhomogeneous, non-linear Magnetic Transmission Lines.

Objectives and Aims

- Research about the Duality of Magnetic Transmission Lines and Electric Transmission Lines.
- Study the Time Domain evolution of Electromagnetic Fields of practical Magnetic Transmission Lines.
- Study the Frequency Domain behavior of Magnetic Transmission Lines.
- Study Cross Talk between Magnetic Transmission Lines.
- Develop Power Flow Equations for Magnetic Transmission Lines in terms of Lumped parameters.

Literature Survey

Faria [1-4] has presented a Time and Frequency domain theory of multi-wire magnetic transmission lines based on the matrix theory of multi-conductor electric transmission lines. For magnetic transmission lines, transverse impedance and the longitudinal admittance determine the propagation constants for the wave modes. Simulations showed that they exhibit super-luminal phase velocity and almost zero attenuation dispersion. He also established a relationship between voltages and currents at the multi-conductor transmission line ports by employing the transmission matrix techniques. Mathematical models were developed for studying the Frequency Domain Behavior of non-uniform Magnetic Transmission Lines. Solutions to Electromagnetic equations were presented in the form of a superposition of natural modes of propagation. The Magnetic Transmission Line exhibited the behavior of a high pass filter, blocking all DC signals. DC signals produce the most severe transients in Electric Transmission

Lines; which behave like a low pass filter. Moreover, he developed a model for ideal transformers using magnetic transmission line theory.

Antonini [10] presented an in-depth analysis of meta-material transmission lines. The ladder network structure of the transmission line was used to obtain dominant zeros and poles. This lead to a rational form of the two port network transfer function. The rational form of the transfer functions provided an efficient time-domain macro model; which accurately captured the physics of composite meta-material transmission lines. Caloz and Itoh [11] also presented non-linear electromagnetic meta-material Transmission Lines focusing on their complex permittivity and permeability. They used the transmission matrix method to formulate equations for the dispersive, distributed non-linear system. These results are very useful in understanding the complex dispersive and radiative nature of Magnetic Transmission Lines.

Edwards and Steer [15] compared copper, ferrite meta-conductor and magnetized permalloy meta-conductor based coplanar waveguides. Magnetized ferrite layer provided some skin effect suppression compared to copper waveguide; however, permalloy provided the most uniform current profile. Some applications of Ferrite materials are high frequency phase shifters, circulators and isolators [18]. Phase shifters used in test and measurement systems can be controlled using the bias magnetic field. Electronically controlled phase shifters are used in phase array antennas for steering antenna beam in space. Microwave circulators use ferrites to separate received and transmitted waves in radar systems. Magnetized films also act as Radio Frequency selective limiters. Microwave Ferrite isolators are used for unidirectional transmission in plasma systems. Their blocking capability protects precious microwave sources.

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Paul [13] has presented Time domain and frequency domain Lumped Inductive-Capacitive Coupling Circuits for cross talk between different Electric Transmission Line Conductors. The generator-receptor model is well suited for studying Radiated/ Conducted Emissions and Susceptibility. Such models must be developed for Magnetic Transmission Lines as well; to study their Electromagnetic Interference and Electromagnetic Compatibility.

Paul, Whites and Nasar [8] have presented a step-by-step method to solve the Maxwell's equations in sinusoidal steady state; due to a given current distribution in a homogeneous, linear, isotropic medium. First, magnetic potential field is calculated at all desired points in space, due to the current distribution. The curl of the magnetic potential field is used to obtain the magnetic field. The Divergence of the magnetic potential field is used to obtain the scalar Electric Potential. In turn, the magnetic potential field and the gradient of the electric potential are used to derive the Electric field. The procedure is much more complicated for waveguides in inhomogeneous, anisotropic, and non-linear media; hence, numerical methods are suggested where a closed form solution is not possible.

Er-Ping [14], [12] has discussed a wide range of standard time and frequency domain Computational Electromagnetics Methodologies. Time Domain Methods include Analytical Methods, Finite Difference Methods (FDTD), Finite Integral Methods (FIT), Finite Volume Methods (FVTD), Fast Multipole Method (FMM), Partial Element Equivalent Circuit Method (PEEC), Transmission Line Method (TLM) etc. Frequency Domain Methods include Method of Moments (MoM), Finite Element Method (FEM), Geometric Theory of Diffraction (GTD), Physical Theory of Diffraction (PTD) etc. He compared Finite Difference Methods, Method of Moments and Finite Element Method, in respect of Principle, geometry materials, Meshing, Matrix Equation and Boundary Treatment. He gave a list of commercially available simulators along with some common applications like high-speed electronics, photonics, microwave circuits, integrated circuits and Antennas. The Finite Difference Method can obtain response over a broad band of frequencies for many non-linear and inhomogeneous media without using matrix equations. This method is well suited for simulation of dispersive, non-uniform Magnetic Transmission Lines.

Methodology

- Carry out Finite Difference Time Domain Electromagnetic Field Simulations in MEEP [6] of dispersive Magnetic Transmission Lines in anisotropic, inhomogeneous, non-linear media.
- Carry out Finite Difference Frequency Domain Electromagnetic Field Simulations in MEEP [6] for Decomposition of Fields into various travelling wave modes. Also, study Frequency Domain Behavior using lumped Magnetic Transmission Line circuit.
- Carry out MATLAB Lumped Magnetic Circuit Simulations for cross talk between Multi-Conductor Transmission Lines.
- Develop Power Flow Equations for Magnetic Transmission Lines in terms of Lumped parameters.

Experimentation

The Electromagnetic simulations will be carried out in MEEP [6] Simulator which is a script based Finite Difference Time Domain Electromagnetic Fields Simulator for solving Maxwell's Equations. MEEP [6] is ideal for modeling the time domain and frequency domain behavior of a variety of arbitrary materials including anisotropic, dispersive, non-linear dielectrics, electric/ magnetic conductors, media with saturable gain/ absorption, and gyrotropic media. This simulator is well suited for Finite Difference Electromagnetic simulation of non-uniform, dispersive Magnetic Transmission Lines exhibiting complex permittivity and permeability. The C++ interface has the features of variable resolution and normalized units. Each spatial unit is modeled as a Yee's Cell. This is ideal for modeling nonlinear, anisotropic, inhomogeneous media. Also, sample data for several materials is provided in libraries for building accurate test structures. The space is divided into independent chunks so that the program can be run on parallel processors. The boundaries can be modeled as perfectly matched layers to prevent reflection of fields. Hence, a wide variety of electric or magnetic current sources can be simulated. The program is solved for all Electric and Magnetic field components. Many derived components can be evaluated like Curl, Divergence, Energy Density, Potential, Flux, Poynting

vector etc. Several Mathematical operations like averaging, symmetry and integration over a line, surface or volume are allowed in cylindrical and rectangular coordinates. The fields can be printed as image or video files as well. A frequency domain solver is also provided for multidimensional Laplace transformation and the decomposition of fields into travelling modes.

Lumped circuits are used for studying linear, time invariant, distributed systems like Magnetic Transmission Lines. The distributed parameters can be calculated using mathematical formulas. MATLAB will be used for modeling the time and frequency domain behavior of Magnetic Transmission Lines in terms of simplified Lumped Circuits.

Experimental Setup

Finite Difference Time Domain Electromagnetic Field MEEP [6] Simulations will be carried out for dispersive Magnetic Transmission Lines in anisotropic, inhomogeneous, non-linear media. The Magnetic Transmission Lines will be constructed using Drude-Lorentz susceptibility models for ferromagnetic conductors like Nickel, Iron and Cobalt alloys. The Transmission Lines will be excited using continuous point sources. The terminations can be modeled by Perfectly matched layers for Surge Impedance Loading; or as perfect reflectors for no load. Different Transmission Line structures can be simulated like the Wideband Transformer and Transmission Line Transformer [7].

In order to study their frequency response to continuous sources, Finite Difference Frequency Domain Electromagnetic Field MEEP [6] Simulations will be carried out. The multi-dimensional Fourier transform and mode decomposition will be used for this study. In order to simplify analysis, the Distributed System will be linearized to obtain a lumped model. The frequency Domain Behavior will also be studied using Transfer Function of Equivalent T-model Transmission Line circuit.

Multi-conductor Transmission Lines introduce many complexities like capacitive/ inductive coupling. MEEP [6] Simulations and MATLAB Lumped Circuit Simulations will be carried out for studying cross talk between Conductors of multi-wire Magnetic Transmission Lines.

As in the case of Electric Transmission Lines, Power Flow Equations can be developed for Magnetic Transmission Lines in terms of Lumped parameters; like per unit length transverse impedance and the per unit length longitudinal admittance. The results can be verified using electromagnetic simulations.

Results Expected and Method of Analysis

The Electromagnetic MEEP [6] Simulations will help to probe the stored Electric/ Magnetic Energy Density, geometric parameters, per unit length losses and Transmission Efficiency of Magnetic Transmission Lines. Among the different magnetic materials, the best alloy will be chosen based on desired performance metrics. A suitable candidate must exhibit minimal radiation and line losses. The transverse impedance and longitudinal admittance dictate the propagation of wave modes in magnetic transmission lines. Simulations will be used to estimate per unit length transverse inductance and longitudinal capacitance, which contribute to the

transverse impedance and longitudinal admittance respectively. These parameters are pivotal in determining the lumped model of the distributed Transmission Line system.

The Magnetic Transmission Lines will be excited by continuous sources to examine their Frequency Response. The Fourier Transform will decompose the Fields into the various travelling wave modes. This will aid the study of the effects of magnetic hysteresis and saturation on power quality [9]. The T-model Equivalent Magnetic circuits and coupled equations will be used to simplify analysis of the transient and steady state behavior. According to theory, Magnetic Transmission Lines must exhibit the behavior of a high pass filter, blocking all DC signals. DC signals produce the most severe transients in Electric Transmission Lines; which behave like a low pass filter. However, this also implies that Magnetic Transmission Lines must be operated at higher frequencies than Electric Transmission Lines. Poorly designed Magnetic Transmission Lines may amplify high frequency noise which can be damaging for the power system. The imaginary part of Transmission Line Magnetic Reluctance, which is a strong function of frequency, contributes to line losses. Hysteresis losses also increase significantly at higher frequencies [9]. Hence, an appropriate frequency must be chosen, considering the complex nature of the magnetic material.

The study of capacitive/ inductive coupling in Multi-Conductor Transmission Lines will provide useful knowledge about the Radiated/ Conducted Emissions and Susceptibility. The generator-receptor model is well suited for studying Electromagnetic Interference and Electromagnetic Compatibility of Magnetic Transmission Lines. The results can be compared with mathematical formulas to build linear circuit models for cross talk between Magnetic Transmission Lines. The aim will be to minimize Electromagnetic Radiation; that can be picked up by intentional receivers like Radio and Television; or unintentional receivers like digital Computers. This will prevent malfunction of the sensitive electronic equipment.

Power Flow Equations for Magnetic Transmission Lines will help to compare the Electromagnetic and Magnetic circuit models. The Power Flow will be represented in the form of Magnetic Current and Magnetic Voltage for circuit Model. For the Electromagnetic Model, the Power Flow will be represented in the form of Magnetic Field and Electric Field. Accurate Estimation of Lumped parameters; like per unit length transverse impedance and the per unit length longitudinal admittance is necessary for producing a valid lumped magnetic circuit for Magnetic Transmission Lines.

References

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by Mohammad Shamaas

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Modeling and Simulation of Magnetic Transmission Lines

ORIGINALITY REPORT

6%	2%	4%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Zinovii Nytrebych, Petro Pukach, Ihor Bobyk, Mykhailo Symotiuk, Anton Kuz. "Mathematical Simulation of Electric Voltage in Lossy Transmission Line and the Problems of Optimizing MEMS - Devices Parameters", 2019 IEEE XVth International Conference on the Perspective Technologies and Methods in MEMS Design (MEMSTECH), 2019 Publication	2%
2	www.nraismc.com Internet Source	1%
3	Haoyu Zhang, Tughrul Arslan, Brian Flynn. "Microwave imaging of a realistic cancerous phantom using an ultra-wideband antenna transceiver system", 2013 Loughborough Antennas & Propagation Conference (LAPC), 2013 Publication	1%
4	Submitted to University of Queensland Student Paper	1%

5	"Introduction", Institution of Engineering and Technology (IET), 2011 Publication	<1%
6	www.ee.bgu.ac.il Internet Source	<1%
7	Submitted to Lebanese International University Student Paper	<1%
8	Submitted to October University for Modern Sciences and Arts (MSA) Student Paper	<1%
9	Introduction to Engineering Electromagnetics, 2013. Publication	<1%

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Exclude bibliography	Off		

Postgraduate Research Committee Meeting, EED, UET Lahore

Wednesday, November 13, 2019

Present

1. Dr. Tahir Izhar (Dean)
2. Dr. K. M. Hasan (Chairman)
3. Dr. Muhammad Tahir
4. Dr. Muhammad Asghar Saqib
5. Dr. Asim Loan
6. Dr. Irfan Ullah Ch.
7. Dr. Umar Tabraiz Shami
8. Dr. Kashif Javed
9. Dr. Farhan Mahmood
10. Dr. Syed A. R. Kashif
11. Dr. Uabid Ullah Fayyaz (Secretary)
12. Dr. Rabia Nazir
13. Dr. Awais Yousaf
14. Dr. Rashid Jalil
15. Dr. Ali Hammad Akbar
16. Dr. Aqsa Shabbir
17. Dr. Fahim Gohar
18. Dr. Farooq Mukhtar

Meeting Started at: 12:20 PM

Meeting Minutes

The PGRC approved the minutes of the meeting held on October 2, 2019.

Appointment of External Reviewer for PhD Research Proposal

The PGRC approved the following external reviewer to review the PhD research proposal of following PhD student.

S. No.	Student Name Regd. No.	Internal Supervisor	PhD Research Title	External Reviewer
1.	ISRA NAZIR 2016-PhD-Elect-6	Dr. Farooq Mukhtar	Design and Optimization of Ultra Fast Frequency Reconfigurable Antenna	Dr. Muhammad Kamran Saleem, EED, UCP, Lahore.

PhD Thesis Evaluation of Hafiz Muhammad Obaid

The members were informed that per the recommendations of the Grievance Committee, formed by the PGRC, Mr. Muhammad Obaid has submitted his PhD thesis after incorporating comments of advisory committee. The members discussed the matter in detail and agreed that the thesis will be forwarded to Grievance Committee and they will decide whether or not sufficient work has been done by the student. Moreover, it was also decided in the meeting that committee will also finalize the list of external examiners for PhD thesis evaluation of Mr. Muhammad Obaid. Once the committee approves the thesis the case for the appointment of external examiners will be forwarded to ORIC.

Time Slot for M.Sc. Presentations

The members were informed that because of the busy schedule of the teachers the PG Office is facing problem in scheduling MSc thesis presentations. The evaluators find it difficult to attend the presentations any random time in the week. Therefore, Wednesday after 11:00 AM has been set aside for M.Sc. thesis presentations. Having presentations on a particular day can also be beneficial for graduate students. Since they can pick which presentation they are interested in and want to attend.

M.Sc. Re-admission

The committee discussed the following application for re-admission to M.Sc. in Electrical Engineering and recommendation made by the committee is shown below.

S. No.	Name of student	Registration No.	Recommendations
1.	AHMED SAAD	2016-MS-EE-60	Exams taken within the last five years with minimum "B" grade can be transferred. Recommended for re-admission.

Appointment of M.Sc. External Examiners

The PGRC recommended the external examiners of following students for their M.Sc. thesis.

Name/ Registration Number	Internal Supervisor	Recommended External Examiners
MUHAMMAD ASIM 2017(F)-MS-EE-64	Dr. Kashif Javed	1. Dr. Aqsa Shabbir, EED, LCWU, Lahore. 2. Dr. Muhammad Fayyaz, SUPARCO, Lahore 3. Dr. Abdur Rehman, CS Deptt. UOG, Gujrat.
MUHAMMAD ARSLAN AHMAD 2017(F)-MS-EE-22	Dr. Umar Shami	1. Dr. Ghulam Abbas, EED, UOL, Lahore. 2. Dr. Ali Nasir, EED, UCP, Lahore. 3. Dr. Intesar Ahmed, EED, LCWU, Lahore.
ABDUL REHMAN 2017-MS-EE-90	Dr. Umar Shami	1. Dr. Ghulam Abbas, EED, UOL, Lahore. 2. Dr. Ali Nasir, EED, UCP, Lahore. 3. Dr. Intesar Ahmed, EED, LCWU, Lahore.
BILAL IMRAN 2017-MS-EE-96	Dr. Ubaid Ullah Fayyaz	1. Dr. Tariq Jadoon, EED, LUMS, Lahore. 2. Dr. Syed Asad Hussain, EED, COMSATS, Lahore. 3. Dr. Junaid Qadir, EED, ITU, Lahore.
FARRUKH IQBAL KHAN 2016-MS-EE-8	Dr. Muhammad Kamran	1. Dr. Sadia Murawwat, EED, LCWU, Lahore. 2. Dr. Ghulam Abbas, EED, UOL, Lahore. 3. Dr. Muhammad Rehan Usman, EED, Superior University, Lhr.
IQRA SAFDAR 2017(F)-MS-EE-59	Dr. Hifsa Shahid	1. Dr. Ghulam Jaffer, SSD, PU, Lahore. 2. Dr. Abdul Rauf, MCS, NUST, Rawalpindi. 3. Dr. Muhammad Zafrullah, EED, UoL, Lahore.
MADIHA SATTAR 2017(F)-MS-EE-49	Dr. Syed Abdul Rahman Kashif	1. Dr. Ghulam Abbas, EED, UOL, Lahore. 2. Dr. Khawaja Riffat Hassan, NTDC, WAPDA, Lahore. 3. Dr. Intesar Ahmed, EED, LCWU, Lahore.
ABIDA PARVEEN 2017(F)-MS-EE-13	Dr. Syed Abdul Rahman Kashif	1. Dr. Ghulam Abbas, EED, UOL, Lahore. 2. Dr. Khawaja Riffat Hassan, NTDC, WAPDA, Lahore. 3. Dr. Intesar Ahmed, EED, LCWU, Lahore.

Appointment of Ph.D. External Examiners

The PGRC recommended the external examiners of following students for their Ph.D. thesis.

Name/ Registration Number	Internal Supervisor	Recommended External Examiners
MUHAMMAD NAVEED ASHRAF 2014-PhD-Elect-14	Dr. Tahir Izhar	**From Abroad** 1. Dr. Zainal bin Salam, Professor, Centre of Electrical Energy Systems, Faculty of Electrical Engineering, Universiti Teknologi Malaysia, 81310 Skudai, Johor Bahru, Malaysia. Email: zainals@utm.my, zainals@fke.utm.my 2. Dr. Kumars Rouzbehi, Associate Professor, Department of System Engineering and Automatic Control, University of Seville, 41004 Seville Spain, E-mail: krouzbehi@us.es, q.rouzbehi@gmail.com 3. Dr. Mahmood Nagrial, Associate Professor, Engineering and Construction Management, Western Sydney University, Locked Bag 1797, Penrith NSW 2751. Australia, Email: m.nagrial@westernsydney.edu.au 4. Dr. Ratil H Ashique, Post-doctoral Research Associate, The University of Sheffield, UK, E-mail: r.h.ashique@sheffield.ac.uk ; ratil.eee05@gmail.com 5. Prof. Dr. A.M. Sharaf, Sharaf Energy Systems, Inc., Fredericton, NB, Canada E3C2P2. E-mail: sharaf@unb.ca ; sharaf@rogers.com ; profdramsharaf@gmail.com. **From Pakistan** 1. Prof. Dr. Aamer Iqbal Bhatti, Professor/Dean ORIC, Capital University of Science and Technology (Formerly Mohammad Ali Jinnah University, Islamabad. Email: aib@cust.edu.pk 2. Dr. Abdul Rauf Bhatti, Chairman / Associate Professor, Department of Electrical Engineering, Government College University Faisalabad, E-mail: bhatti abdulrauf@gcuf.edu.pk, bhatti.abdulrauf@gmail.com. 3. Prof. Dr. Muhammad Amjad, Principal, University College of Engineering & Technology, Islamia University, Bahawalpur. Email: muhammad.amjad@iub.edu.pk

M.Sc. Synopsis

The PGRC approved the following M.Sc. thesis synopsis in this meeting.

Student Name/ Registration Number	Date of Registration	Supervisor Name	Topic	Reviewers
UMAIR BIN TOHEED CHUGHTAI 2017-MS-EE-03	23-Jan-2017	Dr. M. Asghar Saqib	Faults Analysis and Efficient Protection System for Transmission Network Around Base Load Power Plant to Improve Stability	Dr. M. Kamran, Dr. Farhan Mahmood
MOHAMMAD ALI 2017-MS-EE-72	23-Jan-2017	Dr. Tahir Izhar	Energy Efficient Water Pumping System with Maximum Solar Power Utilization and Minimum Reliance on Utility Grid Power	Dr. M. Asghar Saqib, Dr. Umar Shami
MUHAMMAD ZAIN ALI 2017-MS-EE-99	23-Jan-2017	Dr. Kashif Javed	Use of Social Media for Epidemic Surveillance	Dr. H. A. Babri, Dr. Muhammad Ali
MUHAMMAD KHALIL YOUSAF 2017(F)-MS-EE-09	11-Sep-2017	Dr. Syed A. R. Kashif	Integration of Solid State Transformer (SST) with Wind Energy Conversion System (WECS) to Improve Power Quality	Dr. M. Asghar Saqib, Dr. Farhan Mahmood
MUHAMMAD SHAMAAS 2018-MS-EE-4	3-Sep-2018	Dr. M. Asghar Saqib	Modelling and Simulation of Magnetic Transmission Lines	Dr. Syed A. R. Kashif, Dr. Syed Shah Irfan Hussain
JAWARIA AZHAR 2018-MS-TN-11	22-Jan-2018	Dr. Muhammad Ali	Game Theory-based Honeypot for Securing Website	Dr. Kashif Javed, Atif Hameed

Meeting Ended at 12:55 PM.

All PGRC members are requested to submit any **objections on the minutes**, if any, within **3 days** in the Postgraduate Office.

Dr. Ubaid Ullah Fayyaz
Director,
Postgraduate Studies
20-Nov-2019

Dr. Muhammad Asghar Saqib

Associate Professor, Department of Electrical Engineering, UET, Lahore, PAKISTAN saqib@uet.edu.pk

HIGHLIGHTS OF SKILLS AND QUALIFICATIONS

- Teaching experience of more than 11 years
- Experience of testing and measurement in high-current and high-voltage laboratories
- Strong background in power transmission and distribution systems, and applications of power devices
- Postgraduate degrees [Masters and Ph.D.] in electrical (power) engineering [as well as Bachelor in the same field]
- Conducted research on current interruption in high-voltage fuses, and involvement in the development work on expulsion and sand-filled high-voltage fuses
- Teaching and research interests in the areas of power distribution and transmission, high-voltage engineering, electrical drives, power electronics and renewable energy
- Over 3 years of experience in an electric utility
- Strong interpersonal skills
- Performed duties as Dean of the Faculty of Electronic Engineering at GIK Institute for about four months [before joining UET, Lahore]
- Professional communication skills
- Good computer skills in MS Word, MS PowerPoint, Internet / Email, Spreadsheets, Origin, PSpice, Programming in Matlab and Basic.

EDUCATION/QUALIFICATIONS

- Institution: The University of Sydney, Australia

  Qualifications: Ph.D. in Electrical Engineering [My Ph.D. thesis, 'Arc behaviour and confinement in high-voltage fuses' discusses the experimental investigation of electron density and temperature in high-voltage fuses: the knowledge about the dynamics of these two parameters during the arcing period is of vital importance for the better understanding of the successful current interruption.]

  Completed: 1999

- Institution: The University of Sydney, Australia
  Qualifications: Master of Engineering Studies (M.E.S) in Electrical Engineering [Studied a number of courses both from the areas of Power and Electronics; Chose the area of 'Power System Stability' for my M.E.S' project.]
  Completed: 1996
- Institution: University of Engineering and Technology, Lahore, Pakistan
  Qualifications: B.Sc. in Electrical Engineering, with emphasis on Power Engineering
  Completed: 1991

EMPLOYMENT HISTORY

Associate Professor December 2005 – Now
Department of Electrical Engineering, University of Engineering and Technology, Lahore.

- Taught courses 'Power Distribution and Utilisation', 'Power System Protection' and 'AC-DC Drives' to undergraduate, and 'Advanced Power System Protection', 'Insulation Coordination for Power System' and 'Digital Simulation of Power Converters' to postgraduate students.
- Ongoing research activities in the areas of electrical arcs in switchgear, power electronics and electrical drives.
- Conducted, as Secretary, a successful international conference - International Conference on Electrical Engineering 2007 - at the Department of Electrical Engineering [on 11-12 April 2007].

Assistant Professor, Associate Professor and then Dean November 1999 – January2006
Ghulam Ishaq Khan Institute of Engineering Science and Technology, Topi [District Swabi], NWFP 23640, Pakistan

- Taught a number of courses both in the areas of Power and Electronic Engineering such as Transmission and Distribution of Electrical Energy, Power Electronics, Electromagnetic Fields and Waves, Protection of Electrical Networks, Electronics 1, Logic Design, Power System Analysis, Electric Machines, and Power Converters: Design, Control and Applications
- Redesigned laboratory experiments for the course of Electric Machines to make them consistent with the contents taught in theory, and wrote a laboratory manual for the students
- Assisted the students in their laboratory experiments

- Provided technical advice to a large number of students, and supervised some student groups in their final-year projects
- Worked in a number of Departmental and Institute-level committees

Demonstrator/Teaching Assistant July 1995 - August 1999
School of Electrical and Information Engineering, University of Sydney, Australia

- Assisted the School's teaching programme in a number of courses such as Basic Electrical Engineering, Circuit Theory, Fundamentals of Computer Engineering, Design Topics in Electrical Engineering, Management for Engineers, and Power Electronics and Industrial Drives
- Assisted the students in their laboratory experiments
- Coordinated with technical staff regarding the maintenance of faulty equipment
- Familiarised the students of issues related to their safety and those of the equipment
- Prepared solutions and assisted students in tutorials, and marked assignments and laboratory reports

Junior Engineer (Power) May 1992 - January 1994
Pakistan water and power development authority [commonly known as 'Wapda'], Pakistan

- Assisted in the inspection for the testing and operation of electrical and electronic equipment in grid-stations and distribution systems
- Assisted in the design and maintenance of electrical equipment for distribution networks such as transformers, relays, circuit breakers etc.
- Assisted in the inspection of installation and testing of electrical and electronic equipment in a thermal power station

Junior Engineer (Transmission) July 1991 - May 1992
National Engineering Services of Pakistan [commonly known as 'NesPak'], Lahore, Pakistan

- Worked on 500 kV Tarbela-Lahore Transmission Line Project
- Assisted in the preparation of Bidding and Contract documents
- Studied and analysed contractors' drawings and technical submittals
- Inspected invoices of various shipments
- Supervised the testing of various specimens of steel and conductors
- Assisted in the design of bolts and different members of steel towers

- Assisted in progress monitoring, scheduling and control of materials, and in the preparation of progress reports for the Project Manager

OTHER INFORMATION

Awards: Won the Australian government scholarship [AusAID] to study for MES and PhD in University of Sydney [on the basis of exceptional academic results from school – S.S.C. - to the university – Bachelor degree], merit scholarship holder on the basis of excellent performances in H.S.C., S.S.C. and Year 8 examinations, merit scholarship awarded by ICI Pakistan

Languages: English, Urdu, Punjabi

Interests: Seeing new places [tourism] and making new friends; watching cricket on TV; sports like swimming, squash and volleyball; and country-life, animals and gardening

REFEREES

- **PROFESSOR (Dr.) ANTHONY D. STOKES**
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  University of Sydney, NSW 2006, Australia
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- **Dr. IAN S. FALCONER**
  Senior Lecturer School of Physics,
  University of Sydney, NSW 2006, Australia.
  Telephone (Office) : 61-2-9351 2599
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  School of Physics,
  University of Sydney, NSW 2006, Australia.
  Telephone (Office) : 61-2-9351 2712
  Fax (Office) : 61-2-9351 7727
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- **ROSS HUTTON**
  Professional Officer School of Electrical and Information Engineering,
  University of Sydney, NSW 2006, Australia.
  Telephone (Office) : 61-2-9351 5457
  Fax (Office) : 61-2-9351 3847
  E-mail : hutton@ee.usyd.edu.au

LIST OF PUBLICATIONS

Refereed International Journals:

- "Time resolved spectrum of the fuse arc plasma" by M.A. Saqib and A.D. Stokes, Journal of Thin Solid Films, Elsevier Science, Vol. 345, pp. 151-155, 1999.
- "Estimating arc temperature in a model high breaking capacity fuse" by M.A. Saqib, A.D. Stokes, B.W. James and I.S. Falconer, Australian Journal of Electrical and Electronics Engineering, Vol. 1, No. 1, pp. 41-50, 2004.
- "Design, implementation and analysis of a new topology of a boost DC-DC voltage converter" by M.A. Saqib, Kh.S. Karimov, M.M. Ahmed and M.A. Turaeva, International Journal of Applied and Computational Mathematics, Vol. 3, No. 1, 2004.
- "Time-resolved measurement of arc temperature in a sand-filled high-voltage fuse" by M.A. Saqib, A.D. Stokes, B.W. James and I.S. Falconer, Iranian Journal of Electrical and Computer Engineering, Vol. 3, No. 2, pp. 117-121, 2004.
- "Electrochemical hygrometers on the base of orange dye" by Kh.S. Karimov, S.Kh.M. Akhmedov, M.N. Khan, M.A. Saqib, R. Marupov, M.A. Turaeva, M.H. Sayyad, S.A. Moiz, K.B. Khan, I. Homidov and J. Valiev, Journal of Academy of Sciences, Vol. XLVII, No. 9-10, 2004.
- "A method to estimate electron density in a high-voltage fuse' arc" by M.A. Saqib, A.D. Stokes, B.W. James and I.S. Falconer, Iranian Journal of Electrical and Computer Engineering, Vol. 3, No. 2, pp. 122-125, 2004.
- "The steady-state response of a stand-alone synchronous generator to the changes in load current and power factor", by M.A. Saqib, European Journal of Scientific Research [ISSN: 1450-216X], Vol. 2, No. 1, pp. 42-61, March 2005.
- "A simple photo-voltaic tracking system" by Kh.S. Karimov, M.A. Saqib, P. Akhtar, M.M. Ahmed, J.A. Chattha, and S.A. Yousafzai, Journal of Solar Energy Materials and Solar Cells, Elsevier Science, Vol. 87, pp. 49-59, 2005.

- "High efficient solar photoelectric station" Kh.S. Karimov, K. Kabutov, Kh.M. Akhmedov, U.Kh. Karimov, M.A. Saqib and M.A. Ghias, Journal of Academy of Sciences, Dushanbe (Tajikistan), Vol. 49, No. 3, pp. 289-293, 2006.
- "The Use of Simulink and PSpice as Educational Tools in the Teaching of Power Electronics", Accepted for Publication in Australian Journal of Electrical and Electronics Engineering 2007.

Refereed International Conferences:

- "An insight into the fulgurite of a high-voltage fuse" by M.A. Saqib, A.D. Stokes and P.J. Seebacher, Proceedings of the Third Annual International Conference on Industrial Engineering Theories, Applications and Practice, The Hong Kong University of Science & Technology, pn224.pdf, 28-31 December 1998.
- "Characteristics of fuse arcing in different fillers" by M.A. Saqib and A.D. Stokes, Proceedings of the Sixth International Conference on Electric Fuses and their Applications (ICEFA), Turin (Italy), pp. 275-278, 20-22 September 1999.
- "Arc temperature measurement in a high-voltage fuse" by M.A. Saqib, A.D. Stokes, B.W. James and I.S. Falconer, Proceedings of the Sixth International Conference on Electric Fuses and their Applications (ICEFA), Turin (Italy), pp. 107-109, 20-22 September 1999.
- "Measurement of electron density in a high-voltage fuse arc" by M.A. Saqib, A.D. Stokes, B.W. James and I.S. Falconer, Proceedings of the Sixth International Conference on Electric Fuses and their Applications (ICEFA), Turin (Italy), pp. 129-132, 20-22 September 1999.
- "Pressure inside the arc channel of a high-voltage fuse" by M.A. Saqib, A.D. Stokes and P.J. Seebacher, Proceedings of the Sixth International Conference on Electric Fuses and their Applications (ICEFA), Turin (Italy), pp. 83-88, 20-22 September 1999.
- "A spectroscopic study of a high-voltage fuse arc" by M.A. Saqib, A.D. Stokes, B.W. James and I.S. Falconer, presented at 23rd AINSE [Australian Institute of Nuclear Science & Engineering] Plasma Science and Technology Conference, University of Adelaide, 10-15 December 2000.
- "A step-up DC-DC voltage converter using capacitors as energy-storage elements" by Kh.S. Karimov, M.A. Saqib, M.M. Ahmed, M.A. Turaeva and W. Majeed, Proceedings of the IEEE International Multi-topic Conference, Islamabad (Pakistan), 8 – 9 December 2003.
- "Tests for temperature rise, power-dissipation measurement and breaking capacity on a prototype model of a high-voltage fuse" by M.A. Saqib, Proceedings of the IEEE International Multi-topic Conference, Islamabad (Pakistan), 8 – 9 December 2003.
- "A topology of a bi-directional buck/boost DC-DC voltage converter: design, implementation and analysis" by M.A. Saqib, Kh.S. Karimov and Rana A.J. Khan,

Proceedings of the Australian Universities Power Engineering Conference, Melbourne, 10-13 December 2006.

- "Analysis of a two-dimentional negative frequency model in the context of phasor theory" by W. Abbas and M.A. Saqib, Proceedings of the Australian Universities Power Engineering Conference, Melbourne (Australia), 10-13 December 2006.
- "Criteria for the detection of weak signals through a nonlinear bi-stable system" by W. Abbas and M.A. Saqib, Proceedings of the 10th IEEE International Multi-topic Conference (INMIC 2006), Islamabad (Pakistan), 23-24 December 2006.
- "A simple photovoltaic system with load control" by M.A. Ghias, Kh.S. Karimov, S.I.A. Termizi, M.J. Mughal, M.A. Saqib and I.H. Kazmi, Proceedings of the International Conference on Electrical Engineering (ICEE 2007), Lahore, 11-12 April 2007.
- "Effect of nonlinear load distributions on total harmonic distortion in a power system" by W. Abbas and M.A. Saqib, Proceedings of the International Conference on Electrical Engineering (ICEE 2007), Lahore, 11-12 April 2007.
- "Soft starting of an induction motor using adaptive neuro fuzzy inference system" by A.R. Kashif and M.A. Saqib, Proceedings of the International Conference on Electrical Engineering (ICEE 2007), Lahore, 11-12 April 2007.
- "Estimation of the plasma's particle densities during the arcing period of a high-voltage fuse" by M.A. Saqib, A.D. Stokes, I.S. Falconer and B.W. James, Proceedings of the 8th International Conference on Electric Fuses and their Applications (ICEFA), Clermont-Ferrand (France), pp. 121-125, 10-12 September 2007.
- "Soft starter of an induction motor using neural network based feedback estimator" by M.A. Saqib, A.R. Kashif and Tehzeeb-ul-Hassan, Accepted for Australasian Universities Power Engineering Conference, to be held in Perth on 9-12 December, 2007.

National Conferences:

- "Selecting a miniature fuse for circuit protection" by M.A. Saqib and A. Khaliq, Proceedings of the Fourth IEEE International Multi-topic Conference, Islamabad (Pakistan), pp. 75-78, 10-11 December 2000.
- "Determination of the plasma ionisation for an H.B.C. fuse during current interruption" by M.A. Saqib, A.D. Stokes, B.W. James and I.S. Falconer, Proceedings of the Fourth IEEE International Multi-topic Conference, Islamabad (Pakistan), pp. 216-221, 10-11 December 2000.
- "Considerations for an optimal signal detector using stochastic resonance" by W. Abbas and M.A. Saqib, Proceedings of the 10th IEEE International Multitopic Conference (INMIC 2006), Islamabad (Pakistan), 23-24 December 2006.

Miscellaneous Publications:

- "Small signal stability and sensitivity concepts in power system analysis" by M.A. Saqib, Master of Engineering Studies' thesis, School of Electrical and Information Engineering, University of Sydney, Australia, 1996.
- "Arc behaviour and constriction in high-voltage fuses", PhD Thesis, School of Electrical and Information Engineering, University of Sydney, Australia, August 1999.
- "EE313L: Electric Machines' Laboratory Manual" by M.A. Saqib and A. Shah, Faculty of Electronic Engineering, GIK Institute of Engineering Sciences and Technology, Topi (District Swabi), NWFP, Pakistan, 2004.

UNIVERSITY OF ENGINEERING AND TECHNOLOGY, LAHORE.
(STUDENTS SECTION)

No.Univ/SS/ 449
Dated: 3/9/18

NOTIFICATION

It is hereby notified for the information of all concerned that:

1. M.Sc Engineering, CS, CRP/ M.Arch/ M.Phil classes for Fall Session 2018, are commencing from 03rd September 2018.
2. Registration will also open on the same date that is 3rd September 2018 for new postgraduate entries of M.Sc Engineering, CS, CRP/ M.Arch/ M.Phil.
3. The registration date of the whole new batch will be 03-09-2018.

(ZULFIQAR ALI)
Deputy Registrar (SS)
For inchage Students Section

Copy for information to:-

1. All the Deans of Concerned Faculty.
2. All the Chairmen of the Teaching Departments.
3. The Campus Coordinators, KSK
4. The Principal, RCET, Gujranwala.
5. The Director, CEWRE
6. The Director (ORIC).
7. The Director FA&CS.
8. The Controller Examinations.
9. Senior Warden.
10. The Admin Officer (Dues)

3/9/18

No. EE/_____
Dated: _____

The Convener
Admission Committee,
University of Engineering & Technology,
Lahore.

Subject: **List of the M.Sc. Electrical Engineering Students of Session Fall- 2018**

Following students have provisionally been admitted in M.Sc. Electrical Engineering for the session Fall-2018. The allotted registration numbers are shown against their names.

S. No.	Name	Father Name	Specialization	Registration Number
1.	FAISAL ALI	MUHAMMAD ALI	Power	2018-MS-EE-001
2.	SAAD MASOOD	SH. MASOOD AKHTER	Power	2018-MS-EE-002
3.	MUAAZ TARIQ	MUHAMMAD TARIQ	Power	2018-MS-EE-003
4.	MUHAMMAD SHAMAAS	ABDUL RAZZAQ	Power	2018-MS-EE-004
5.	RUQAIYA BANO	MUSHTAQ ALI	Power	2018-MS-EE-005
6.	MUHAMMAD ZAWAR HASAN	MUHAMMAD MAZHAR HASAN	Power	2018-MS-EE-006
7.	MUHAMMAD UMER ARSHAD	MUHAMMAD ARSHAD MUGHAL	Power	2018-MS-EE-007
8.	MUHAMMAD HAMZA ZAFAR	CH. ZAFAR IQBAL	Power	2018-MS-EE-008
9.	ASAD ULLAH MEHDI	MEHDI KHAN	Power	2018-MS-EE-009
10.	SHAHROZE LIAQUAT	LIAQUAT ALI KHALIQUE	Power	2018-MS-EE-010
11.	MUHAMMAD ZEESHAN TAHIR	MUHAMMAD TAHIR ISHAQ	Power	2018-MS-EE-011
12.	AASHIR HANIF	MUHAMMAD HANIF	Power	2018-MS-EE-012
13.	MUHAMMAD USMAN	MUHAMMAD ABDUL SALAM	Power	2018-MS-EE-013
14.	MUHAMMAD KHIZER	ALTAF HUSSAIN	Power	2018-MS-EE-014
15.	WAQAS MAQSOOD	MAQSOOD AHMAD	Power	2018-MS-EE-015
16.	HASSAN ALI	MUHAMMAD ASLAM	Power	2018-MS-EE-016
17.	ABDULLAH KHALID	MUHAMMAD AJMAL KHALID	Power	2018-MS-EE-017
18.	TALHA YAHYA	MUHAMMAD KHALIL SUBHAN	Power	2018-MS-EE-018
19.	HASSAAN AHMAD	SYED ALI AHMAD	Power	2018-MS-EE-019
20.	FAWAD AHMED	JAMIL AHMED	Power	2018-MS-EE-020
21.	AMNA	MUHAMMAD ARSHED ALI	Control	2018-MS-EE-021
22.	AHMAD HUSSAIN SAFDER	MUHAMMAD SAFDER	Control	2018-MS-EE-022
23.	SAQIB AKRAM	HAFIZ MUHAMMAD AKRAM	Control	2018-MS-EE-023
24.	ZAIN UL ABDIN	NISAR AHMED	Control	2018-MS-EE-024
25.	MUHAMMAD USMAN QADEER	MUHAMMAD QADEER	Control	2018-MS-EE-025
26.	SHEHZEEN MALIK	TALAT MEHMOOD	Control	2018-MS-EE-026

S. No.	Name	Father Name	Specialization	Registration Number
		MALIK		
27.	AGHA MUHAMMAD MUJTABA	AGHA ZAFAR ALI	Control	2018-MS-EE-027
28.	ABDUL ALEEM	MUHAMMAD HAROON	Control	2018-MS-EE-028
29.	BILAL AHMED	MANZOOR HUSSAIN	Control	2018-MS-EE-029
30.	NABIYA ELLAHI	MALIK ISRAR ELLAHI	Control	2018-MS-EE-030
31.	IMRAN KHAN	JALAL KHAN	Control	2018-MS-EE-031
32.	MUHAMMAD FARHAN NAEEM	MUHAMMAD NAEEM ZAHOORI	Control	2018-MS-EE-032
33.	FAHAD TANVEER	MUHAMMAD TANVEER	Electronics & Communication	2018-MS-EE-033
34.	HASSAAN KHALID	KHALID MAHMOOD	Electronics & Communication	2018-MS-EE-034
35.	MUHAMMAD SOMAIR KHAN	MUHAMMAD MASKEEN KHAN	Electronics & Communication	2018-MS-EE-035
36.	AMEER HAMZA	MAHMOOD ALI	Electronics & Communication	2018-MS-EE-036
37.	MUHAMMAD UMER IDREES	MUHAMMAD IDREES	Electronics & Communication	2018-MS-EE-037
38.	AHMAD REHAN PARACHA	MUHAAMMAD ASLAM PARACHA	Electronics & Communication	2018-MS-EE-038
39.	WAQAR ZAMAN	KHADAM HUSSAIN	Electronics & Communication	2018-MS-EE-039
40.	HAMZA NAEEM	NAEEM AKHTAR JAVAID	Electronics & Communication	2018-MS-EE-040
41.	SHARJEEL SHAHID	SHAHID NAVEED	Electronics & Communication	2018-MS-EE-041
42.	GHULAM MUSTAFA	ABDUL RASHEED	Electronics & Communication	2018-MS-EE-042
43.	KHIZAR FARRUKH KHAN SURI	FARRUKH JAVAID KHAN	Electronics & Communication	2018-MS-EE-043
44.	MUHAMMAD HASSAN	MUSTAFA QAISER	Electronics & Communication	2018-MS-EE-044
45.	MUHAMMAD USAMA ANJUM	ANJUM AQEEL ASGHAR	Computer	2018-MS-EE-045
46.	SANA	YOUNAS	Computer	2018-MS-EE-046
47.	TAHIRA SHEHZADI	ZAFAR IQBAL SHAHZAD	Computer	2018-MS-EE-047
48.	MUHAMMAD ALI TARIQ	TARIQ JAVAID	Computer	2018-MS-EE-048
49.	ASAD ULLAH KHAN	ABDUL MAJEED	Computer	2018-MS-EE-049
50.	SIDRA SAHER	MUHAMMAD RAZZAQ NAZ	Computer	2018-MS-EE-050
51.	MUSTAFA HAIDER	GHULAM HAIDER	Computer	2018-MS-EE-051
52.	ASMA MAQSOOD	MAQSOOD AHMAD	Computer	2018-MS-EE-052
53.	MUHAMMAD IBRAHIM ZAFAR	ZAFAR HAYAT	Computer	2018-MS-EE-053
54.	MUHAMMAD USMAN	TARIQ ALI	Computer	2018-MS-EE-054
55.	USMAN ARSHAD	MUHAMMAD ARSHAD	Computer	2018-MS-EE-055
56.	MUHAMMAD USMAN KHAN	MUHAMMAD AYUB KHAN	Computer	2018-MS-EE-056
57.	SADDIQUE HAROON	SYED HAROON	Computer	2018-MS-EE-057

S. No.	Name	Father Name	Specialization	Registration Number
		RASHEED		
58.	MUHAMMAD AQEEL IJAZ	IJAZ ASLAM	Computer	2018-MS-EE-058
59.	AQSA YOUSAF	MUHAMMAD YOUSAF	Computer	2018-MS-EE-059
60.	AASMA ASLAM	MUHAMMAD ASLAM	Computer	2018-MS-EE-060
61.	MUBEEN RAZA	MUHAMMAD RASHID	Control	2018-MS-EE-061
62.	UMER HAYAT KHAN	SHER AFSAR KHAN	Electronics & Communication	2018-MS-EE-062
63.	MUHAMMAD SHEHRAM KHAN	MUHAMMAD SHAMSHAD KHAN	Control	2018-MS-EE-063
64.	SYED FARHAN ABBAS	SYED IFTIKHAR HUSSAIN	Computer	2018-MS-EE-064
65.	MUHAMMAD KASHIF	MUHAMMAD SHARIF	Control	2018-MS-EE-065

Chairman,
Department of Electrical Engineering

Copy to: -

1. Dean, Faculty of Electrical Engineering
2. Director General of Research
3. Librarian
4. Controller of Examination
5. Admin officer (Dues)
6. Admin officer (Accounts)
7. Chairman Placement Bureau
8. IT Manager, Computer Cell
9. Concerned File

Web Generated Unofficial Transcript

Registration 2018-MS-EE-4 **Student Name:** Muhammad Shamaas

Course Code	Course Title	CH	Grade	GPs	Status
Fall 2018					
EE-505	Optimization Theory	3.0	A	12.0	Confirmed
EE-530	Power Electronic Converters	3.0	A-	11.1	Confirmed
EE-543	Power System Planning	3.0	B	9.0	Confirmed
Semester CH: 9.0	GPA: 3.567	CGPA: 3.567		Status: Promoted	
Spring 2019					
EE-504	Advanced Power Systems	3.0	A-	11.1	Confirmed
EE-599d	Wind Energy Conversion Systems	3.0	A	12.0	Confirmed
EE-599t	Switch Mode Power Supply	3.0	B	9.0	Confirmed
Semester CH: 9.0	GPA: 3.567	CGPA: 3.567		Status: Promoted	

Dated: November 12, 2019

*Errors and omissions excepted