Personal details

Personal details

First / given name	Anas
Second given name	
Third given name	Ashraf
Surname/family name	Ashraf
Date of birth	08 January 1999
Preferred first/given name	Anas
Previous surname	
Country of birth	Pakistan
Legal nationality	Pakistani
Dual nationality	
Country of residence	Pakistan
Have you previously studied with us at the University of Bristol?	No

Contact details

Home address

Please provide your permanent residential address. If you have another address and would prefer for us to contact you at that address instead you have the opportunity to add a correspondence address in the next section.

Country	Pakistan
Postcode	61100
Address Line 1	House No 58 Street No 2 Green
Address Line 2	Town Danewal Vehari
City	Vehari
County	Punjab
Telephone	

If you would like us to send any postal correspondence to an address which is not your home address please enter an alternative address here. If you want us to send correspondence to your home address then please select No.

Do you want to add a correspondence address?	No
Country	Pakistan
Postcode	61100
Address Line 1	House No 58 Street No 2 Green
Address Line 2	Town Danewal Vehari
City	Vehari
County	Punjab
Telephone	

Agent

Agent details

Agency Name	
Email address	

Other information

Additional Documents

Please upload required documents as outlined in your admissions statement

Mode of study

How would like to study this programme?	Full Time

Qualifications

Qualifications

Institution	Qualification	Type	Subject	Actual/predicted	Grade	Start date	End date
COMSATS Institute of Information Technology	Master's Degree (PG)	Academic Qualification	Mathematics	Actual	3.78/4.00	09/Aug/2020	15/Sep/2022
University of Education Lahore	Other Qual	Academic Qualification	Mathematics	Actual	3.33/4.00	19/Oct/2015	26/Sep/2019

If these qualifications have altered since your last application please note the changes in the free text box here.

English Language

Is English your first language? Yes
What is your first language?
Did you study at school/university where you were taught in English?
For how many years?
Have you sat a relevant English language test?

TOEFL (internet-based)

Registration number
Date of TOEFL test
TOEFL reading score
TOEFL listening score
TOEFL speaking score
TOEFL writing score
TOEFL total score

IELTS (International English Language Testing System)

Test report form (TRF) number
UKVI number (if applicable)
Date of IELTS test
IELTS listening score
IELTS reading score
IELTS writing score
IELTS speaking score
IELTS total score

Pearson Test of English

Score report code
Date of Pearson test
Pearson listening score
Pearson reading score
Pearson speaking score
Pearson writing score
Pearson overall score

Other English Language test

Name of course	
Registration number	
Date of test	
Listening score	
Writing score	
Reading score	
Total score	

Experience

Current Employer

Employer name and address	Punjab Institute of Science and Technology Vehari Address: Faisal Town Vehari Near Faisal Mosque
Job title and main duties	Lecturer Mathematics My main duties I take 4 lectures on mathematics and also i am the incharge of students affairs
Full time/Part time	Full time
Date of Appointment	15 March 2024
End date (if applicable)	

Previous employment 1

Employer name and address	
Job title and main duties	
Full time/Part time	
Date of Appointment	
End date (if applicable)	

Previous employment 2

Employer name and address	
Job title and main duties	
Full time/Part time	
Date of Appointment	
End date (if applicable)	

Previous employment 3

Employer name and address	
Job title and main duties	
Full time/Part time	
Date of Appointment	
End date (if applicable)	

Other Experience

Do you have any other relevant work experience to support your application?	No
Please provide details	

Personal statement

Personal details

Do you have a personal statement to upload?	Yes
Please type your personal statement in the box	

Research proposal

Research proposal

Proposed supervisor 1	
Proposed supervisor 1	
Proposed project title (max 150 chars)	Exploring Lie Group and Lie Algebra Structures in Toeplitz Matrix Theory

Passport and visa

Visa required

Do you require a visa to study in the UK?	Yes

Please fill out your passport details below. If you are unable to provide these at the current time you will have another opportunity to upload your passport after you submit the form. If you do not provide us with this information we will be unable to issue you with your confirmation of acceptance number and you will be unable to obtain a visa.

Passport details

Passport number	PL1840241

Further details

Have you previously studied in the UK?	No
What was the highest level of study in the UK?	
Please confirm the total length of your UK study in years	

Referees

Referee 1

Do you have a reference to upload?	Yes
Type of reference	
Referee title	
Forename	
Surname	
Position	
Institution/Company	
Email address	
Country	

Referee 2

Do you have a second reference to upload?	Yes
Type of reference	
Referee title	
Forename	
Surname	
Position	
Institution/Company	
Email address	
Country	

Funding

Funding 1

What is your likely source of funding?	Yourself/family
Please give the name of your scholarship or Studentship	
Please specify	
Percentage from this source	70
Is this funding already secured?	No

Funding 2

What is your likely source of funding?	
Please give the name of your scholarship or Studentship	
Please specify	
Percentage from this source	
Is this funding already secured?	

Funding 3

What is your likely source of funding?	
Please give the name of your scholarship or Studentship	
Please specify	
Percentage from this source	
Is this funding already secured?	

Other funding

I would like to be considered for other funding opportunities	Yes

Submission

Documents

Document type	File name
Degree certificate	BS Degree.pdf
Personal statement	Personal Statement.pdf
Research proposal	research statement .pdf
Transcript	BS Transcript.pdf
Curriculum vitae	Anas Ashraf resume (1).pdf
Passports and visas	Psprt.pdf
References	Reference Letter for Anas.pdf
References	2 recommendations letter.pdf
Degree certificate	MS Degree.pdf
Transcript	MS Transcript.pdf

By ticking the checkbox below and submitting your completed online application form, you acknowledge the University of Bristol will use the information provided from time to time, along with any further information about you the University may hold, for the purposes set out in the University's full Data Protection Statement. Applicants applying to the collaborative programmes of doctoral training should also read the Data Protection Statement for collaborative programmes of doctoral training.

The information that you provided on your application form will be used for the following purposes:

- To enable your application for entry to be considered and allow our Admissions Advisors, where applicable, to assist you through the application process;
- To enable the University to compile statistics, or to assist other organisations to do so. No statistical information will be published that would identify you personally;
- To enable the University to initiate your student record should you be offered a place at the University.

All applicants should note that the University reserves the right to make without notice changes in regulations, courses, fees etc at any time before or after a candidate's admission. Admission to the University is subject to the requirement that the candidate will comply with the University's registration procedure and will duly observe the Charter, Statutes, Ordinances and Regulations from time to time in force.

By ticking the checkbox below and submitting your completed online application form, you are confirming that the information given in this form is true, complete and accurate and that no information requested or other material information has been omitted. You are also confirming that you have read the Data Protection Statement and you confirm the statement below.

I can confirm that the information I have provided is true, complete and accurate. I accept that the information given in my application will be stored and processed by the University of Bristol, in accordance with the *UK General Data Protection Regulation and Data Protection Act 2018*, in order to:

- Consider my application and operate an effective and impartial admissions process;
- Monitor the University’s applicant and student profile;
- Comply with all laws and regulations;
- Ensure the wellbeing and security of all students and staff;
- If my application is successful to form the basis of the statement made within my application.

If the University of Bristol discovers that I have made a false statement or omitted signification information from my application, for example examination results, I understand that it may have to withdraw or amend its offer or terminate my registration, according to circumstances.

europass

Anas Ashraf

Nationality: Pakistani **Date of birth:** 08/01/1999 **Gender:** Male

Phone number: (+92) 3009180068 **Email address:** anskhan739@gmail.com

LinkedIn: https://www.linkedin.com/anas-ashraf-101b95156

Home: House No 58 Street No 2 Green Town Vehari, 61100 Vehari (Pakistan)

ABOUT ME

Anas Ashraf is a Pakistani mathematician renowned for his expertise in mathematical analysis, including Graph theory, Fuzzy theory, Group theory, mathematical modelling, fixed point theory and Network theory. Actively contributing to teaching, research and service. Anas's commitment to education is evident through his training of educators, curriculum development and positive learning environment maintenance.

EDUCATION AND TRAINING

Master's of Science (MS) in Mathematics

Comsats University Islamabad Vehari Campus [09/09/2020 – 14/09/2022]

Address: Mailsi-Vehari Rd, Vehari Punjab, 61100 | **Field(s) of study:** Graph Theory | **Final grade:** 3.78/4.00 | **Thesis:** Irregularity Indices of Benes Network Butterfly Network and Their Derived Networks

- Graph Theory
- Fuzzy Theory
- Mathematical Modeling
- Group Theory
- Data Science

Bachelor of Sciences (BS) in Mathematics

University of Education Lahore Vehari Campus [18/10/2015 – 25/09/2019]

Address: 29Q9+R3R, Vehari, Punjab, Pakistan., 61100 | **Field(s) of study:** Mathematics | **Final grade:** 3.33/4.00 | **Thesis:** Homotopy Perturbation method for solving forth order Integro Differential Equations.

Master of Arts in Education (2 years)

Allama Iqbal Open University [02/10/2021 – 19/02/2024]

Address: 2 Ashfaq Ahmed Rd, H-8/2, Islamabad Capital Territory, 44000 Islamabad | **Final grade:** 1318/2000

FSc(Math, Physics, Chemistry)

Govt Post Graduate College Vehari [01/09/2013 – 12/09/2015]

Address: 28 WX+4GP, Vehari, Punjab, Pakistan., 61100 Vehari (Pakistan) | **Final grade:** 778/1100

Matric(Math, Physics, Chemistry)

Govt Model High School [07/01/2011 – 25/07/2013]

Address: 29R4+F8J, Main Road, G Block Vehari, Punjab, Pakistan., 61100 Vehari (Pakistan) | **Final grade:** 739/1050

WORK EXPERIENCE

Visiting Lecturer Mathematics

Punjab Institute of Technology [01/02/2024 – Current]

Address: Faisal Town, Vehari, Punjab Pakistan, 61100 Vehari (Pakistan) | **Name of unit or department:** Mathematics

Working as a Lecturer of Mathematics
Contract Basis

Visiting Lecturer Mathematics

Comsats University Islamabad [16/09/2022 – 08/03/2023]

Address: Mailsi-Vehari Rd, Vehari (Pakistan)

Worked as a Visiting Lecturer
Contract Basis

DIGITAL SKILLS

Microsoft office / Microsoft word / Mathematica / LaTex / Microsoft excel / Microsoft PowerPoint / MATLAB / Python Initial

PROJECTS

[06/04/2021 – 01/09/2022]

Worked on Several Projects during Master's.

- On Computing Distance Based Entropy of Ferrocene Dendrimers
- On Eccentricity Based Topological Indices of Ferrocene Dendrimers
- On Banhatti Indices of Butterfly Networks, Benes Network and the Networks Derived from Benes Network
- On Computation of Edge Degree Based Banhatti Indices of a Certain Molecular Network

PUBLICATIONS

[2024]

Anas. A, Fahad. A, Imran. M, Anwar. M, Rida. I, (2024) "IRREGULARITY BASED ENTROPY INEQUALITIES DETERMINING INTERCONNECTION NETWORK COMPLEXITY WITH APPLICATIONS IN COMMUNICATION SYSTEMS". This publication is submitted to **"MDPI AG (Multidisciplinary Digital Publishing Institute)".**

LANGUAGE SKILLS

Mother tongue(s): Urdu

Other language(s): English | Italian as a Beginner

SCHOLARSHIPS/FUNDING

[19/10/2015 – 26/09/2019]

Punjab Educational Endowment Fund (PEEF) BS Scholarship/Funding

PEEF BS Scholarship covers

- University Tuition fees for the period of 4 years
- Accomodation

CERTIFICATIONS

My Ceritifications

- *Algebra and Differential Calculus for Data Science*, **University of Colorado Boulder,** https://coursera.org/verify/EHGQ9SXADVBK
- *Algebra: Elementary to Advanced Equations and Inequalities,* **John Hopkins University,** https://coursera.org/verify/FRSR6G4WVMFK
- **Digital Literacy,** *Enhance Digital Skills (MS Office+Social Media)*, https://digiskills.pk/verify/SPNGPKXMK
- *Leading Teams: Developing as a leader,* **University of Illinois,** https://coursera.org/verify/CMP6A9HZYGNN
- *Writing Professional Email and Memos (Project-Centered Course)*, **Kennesaw University**, https://coursera.org/verify/TM7UUA7KM6FS
- *Introduction to Artificial Intelligence (AI)*, **IBM**, https://coursera.org/verify/JT2DNHWHDVS7
- *Introduction to Python Fundamentals*, **University of Colorado Boulder**, https://coursera.org/verify/HFR4SQR5A825
- *English for Career Development,* **University of Pennsylvania,** https://coursera.org/verify/7JUW2D5CUMHK
- *Italian for Beginners*, **Alison,** Certificate No. 4278-27000850

CONFERENCES AND SEMINARS

[2018] Islamabad
International Students Convention & Expo 2018

[2019] University of Education Lahore Vehari
One Day Symposium on Pure and Applied Mathematics Secretary Symposium organizer: Managed the organizing work of symposium.

HONOURS AND AWARDS

[2017] University of Education Lahore Vehari
Laptop from Prime Minister Scheme Received from PM laptop scheme at Bachelor's level to top 5 in the class.

[2012] Govt Model High School Vehari
Solar Lamp Got Solar Lamp from Chief Minister of Punjab at Matric Level.

RECOMMENDATIONS

Name: Dr Hafiz Muhammad Asim Zafar | Associate Professor of Mathematics
Supervisor of Mphil Mathematics
Comsats University Islamabad Vehari
Email: asimzafar@cuivehari.edu.pk | **Phone number:** (+92) 3334599884

Name: Dr. Muhammad Imran Qureshi | Associate Professor of Mathematics
Head of Department at Comsats University Islamabad Vehari
Email: imranqureshi@cuivehari.edu.pk | **Phone number:** (+92) 3146118139

No. 099682

Registration No. VR150199

University of Education, Lahore

UNIVERSITY OF EDUCATION
UE
TRUTH: THE ULTIMATE VIRTUE
یونیورسٹی آف ایجوکیشن

2015-2019

This is to certify that

ANAS ASHRAF
son/daughter of MUHAMMAD ASHRAF
of
University of Education Vehari Campus, Vehari

has obtained the degree of

Bachelor of Science (Honors)
in
Mathematics

after fulfillment of all requirements of semester system
with CGPA 3.33

Controller of Examinations

Date: 09 JAN 2020

Chancellor

15177-1035

PAF I&SC, MULTAN
Branch/Trade EDU INST (MATH)
Reg No. M 333 - 2109 - 0137
Date 14/04/21 Sig.
Verified by 'A'

Ministry of Foreign Affairs, Pakistan
LHR57149st

31 MAY 2023

Checked by Mr. Muhammad Shahid
Protocol Officer

COUNTERSIGNED ONLY
Ministry of Foreign Affairs is Not responsible for the contents of the Document

ATTESTATION STAMP
Rs25
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HIGHER EDUCATION COMMISSION
PAKISTAN
2647479

ATTESTED
MS. UMBER AJAZ
Attestation Officer
29 JUN 2022
Higher Education Commission,
Regional Center, Lahore

Serial No: 098515

Registration No: CIIT/FA20-RMT-010/VHR

COMSATS University Islamabad

ANAS ASHRAF s/o MUHAMMAD ASHRAF

Of

Vehari Campus

has been conferred upon the degree of

Master of Science in Mathematics

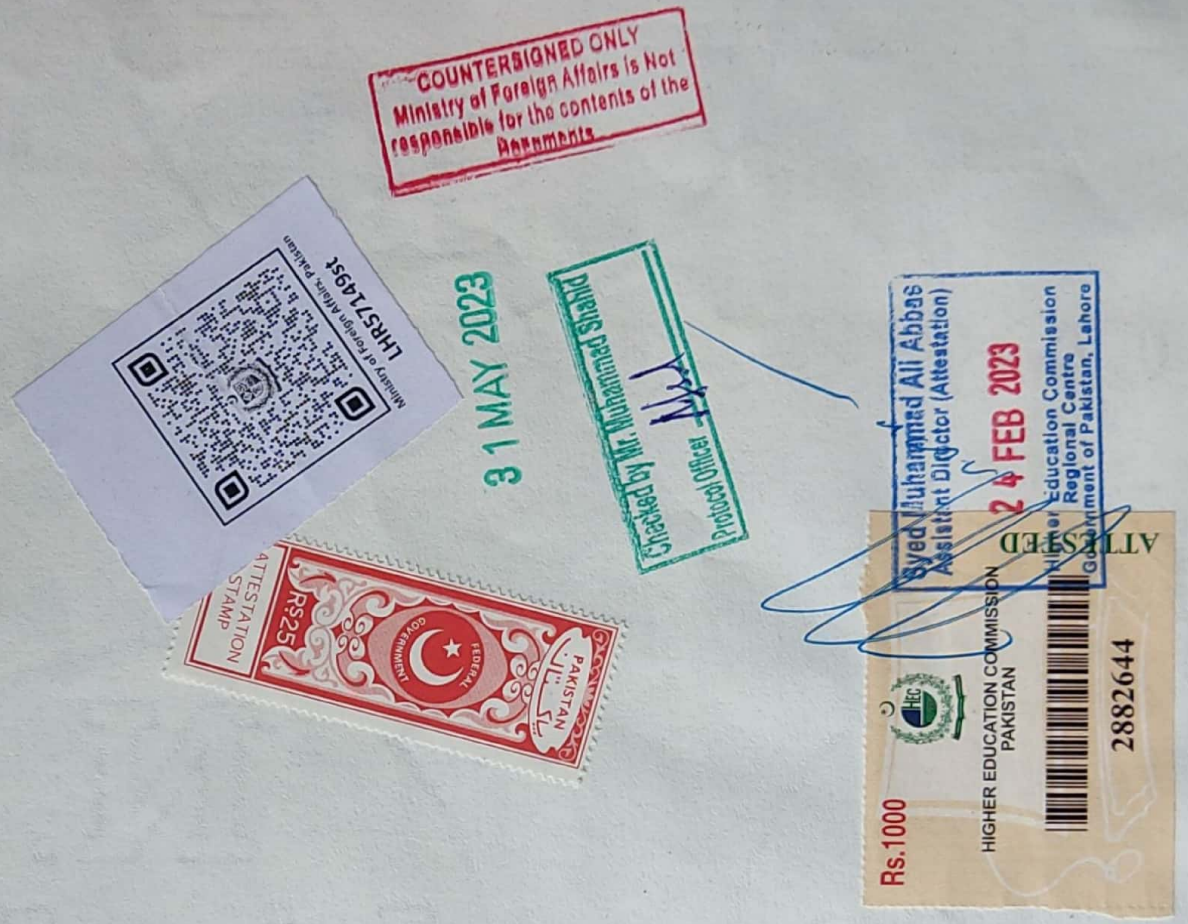
Given on this Fifteenth day of September two thousand and Twenty Two at Islamabad

Date of Issuance: 15th September 2022

Controller of Examinations

Rector

Registrar



Prepared By: .....

Checked By: .....

Note: This degree is issued without alteration or erasure.

Contact Address:
COMSATS University Islamabad,
Park Road, Tarlai Kalan,
Islamabad, Pakistan.
Ph: +92-51-9247000-3
http://www.comsats.edu.pk

Personal Statement
For Phd Mathematics
University of Bristol
Anas Ashraf

As an aspiring mathematician driven by a passion for exploration and discovery, I, Anas Ashraf, am excited to articulate my aspirations and qualifications as I apply for a PhD in Mathematics at the University of Bristol.

My academic journey has been a testament to my commitment to excellence and intellectual curiosity. Having earned my Master's degree in Mathematics from Comsats University Islamabad Vehari with a commendable CGPA of 3.78/4.00, I have consistently pursued academic rigor and scholarly inquiry. My time at Comsats University provided me with a solid foundation in mathematical theory and research methodology, empowering me to engage with complex mathematical concepts with confidence and enthusiasm.

During my Master's program, I delved into the realm of graph theory, captivated by its elegance and applicability across diverse domains. Graph theory serves as a powerful tool for modeling and analyzing relationships in various fields, including computer science, social networks, and optimization. Its ability to represent complex structures and phenomena in a visual and intuitive manner intrigued me, sparking my curiosity and driving me to explore its depths.

My research focused on exploring the intricate structures and properties of graphs, investigating fundamental questions and challenging conjectures within the field. I was particularly interested in studying graph algorithms and their applications, seeking to develop efficient algorithms for solving combinatorial optimization problems on graphs. Through rigorous analysis and innovative problem-solving, I endeavored to contribute novel insights to the ever-evolving landscape of graph theory.

One of the highlights of my research journey was the opportunity to collaborate with fellow mathematicians and researchers on various projects and initiatives. These collaborations not only enriched my understanding of graph theory but also fostered a spirit of camaraderie and shared intellectual curiosity. Working closely with mentors and peers, I gained valuable insights into the research process, honed my analytical skills, and cultivated a deep appreciation for the beauty and intricacy of mathematical inquiry.

The prospect of pursuing a PhD in Mathematics at the University of Bristol excites me immensely, as it represents a unique opportunity to further explore my passion for graph theory under the guidance of esteemed scholars and researchers in the field. The University of Bristol's renowned Mathematics department boasts a vibrant academic community and a rich tradition of groundbreaking research, making it an ideal environment for intellectual growth and collaboration.

In addition to its academic excellence, the University of Bristol offers a dynamic and inclusive campus culture that fosters creativity, innovation, and interdisciplinary collaboration. I am particularly drawn to the university's commitment to diversity and inclusion, as I believe that diverse perspectives and experiences enrich the academic discourse and contribute to a vibrant intellectual community. I look forward to engaging with fellow scholars from diverse backgrounds, exchanging ideas, and collectively pushing the boundaries of mathematical knowledge.

As I embark on this next chapter of my academic journey, I am eager to immerse myself in the vibrant academic culture at the University of Bristol, where I can engage in interdisciplinary dialogue, collaborate with fellow scholars, and contribute to the advancement of mathematical knowledge. My ultimate goal is to make meaningful contributions to the field of mathematics through rigorous research, innovative problem-solving, and a steadfast commitment to academic excellence.

In conclusion, I am confident that my academic background, research experience in graph theory, and passion for mathematical inquiry make me a strong candidate for the PhD program in Mathematics at the University of Bristol. I am excited about the prospect of joining the University of Bristol community and am committed to pursuing excellence in both scholarship and research endeavors.

In the present document, I will describe the research plan I wish to carry during my PhD studies at the University of Bristol. The intricate study of Lie groups and Lie algebras has long been important in mathematical theory. This proposal seeks to explore an intriguing yet underexplored realm within this framework: the domain of Toeplitz matrices. While Lie theory has shed light on numerous mathematical structures, its application to Toeplitz matrices, new in signal processing and numerical analysis, remains relatively unexplored. This proposal endeavors to bridge this gap by investigating the inherent Lie group and Lie algebraic structures of Toeplitz matrices, thereby unlocking new avenues for understanding and utilizing these fundamental mathematical constructs. Through this exploration, we aim to enrich not only theoretical mathematics but also practical applications spanning diverse fields such as signal processing, quantum information theory, and machine learning.

1. Introduction and Background

The study of Lie groups and Lie algebras has been instrumental in various areas of mathematics and physics, offering profound insights into symmetry, transformation, and geometric structures. However, the application of Lie theory to Toeplitz matrices remains relatively unexplored. Toeplitz matrices, characterized by constant diagonals, are ubiquitous in signal processing, numerical analysis, and other fields. This proposal aims to investigate the Lie group and Lie algebra structures inherent in Toeplitz matrices, unraveling their underlying symmetries, and transforming our understanding of these fundamental mathematical objects.

2. Objectives:

• Investigate the Lie group structure of Toeplitz matrices: We will explore the continuous symmetries inherent in Toeplitz matrices, identifying Lie groups associated with specific classes of Toeplitz matrices.

• Analyze the Lie algebra of Toeplitz matrices: We will examine the Lie algebraic properties of Toeplitz matrices, characterizing the infinitesimal generators of their transformations and Lie brackets.

• Develop computational tools and algorithms: Leveraging insights from Lie theory, we will develop novel computational tools and algorithms for efficient manipulation, factorization, and inversion of Toeplitz matrices.

Explore applications in signal processing and beyond: We will apply the developed methodologies to address challenges in signal denoising, compression, and reconstruction, as well as explore potential applications in quantum information theory and machine learning.

3. Literature Review

Sophus Lie's groundbreaking works in the late 19th century laid the foundation for the study of Lie group and Lie algebra structures in mathematical objects. While significant strides have been made in understanding these properties in symmetric matrices, relatively scant attention has been devoted to Toeplitz matrices [2]. Noteworthy contributions include early studies by Ma and Wang (2003), which initiated exploration into the connection between Toeplitz matrices and specific Lie groups [3]. However, further investigation is imperative to comprehensively elucidate the Lie group and Lie algebra structures of Toeplitz matrices and their implications for practical applications [4].

4. Research Questions

1. What Lie group structures are associated with different classes of Toeplitz matrices?
2. How can Lie algebraic techniques be employed to characterize the infinitesimal generators of transformations in Toeplitz matrices?
3. What computational tools and algorithms can be developed based on Lie theory to efficiently manipulate and analyze Toeplitz matrices?
4. What are the potential applications of Lie group theory in addressing challenges in signal processing, quantum information theory, and machine learning using Toeplitz matrices?

5. Methodology

The research methodology entails a multifaceted approach integrating mathematical analysis, computational simulations, and application-driven research. Initially, we will investigate the Lie group structures associated with different classes of Toeplitz matrices, drawing upon techniques from differential geometry and representation theory [5]. Subsequently, computational simulations will validate theoretical findings and evaluate algorithmic efficacy [6]. Concurrently, collaboration with domain experts will facilitate the exploration of specific applications in signal processing, quantum information theory, and machine learning [7].

6. Expected Outcomes

• Enhanced understanding of the Lie group and Lie algebra structures of Toeplitz matrices.
• Development of novel computational tools and algorithms for efficient manipulation and analysis of Toeplitz matrices.
• Advancements in signal processing, quantum information theory, and machine learning applications utilizing Toeplitz matrices [8].

7. Timeline for Three Years PhD in Mathematics

Year 1. Literature review, preliminary research, and formulation of research questions.
Year 2. Mathematical analysis, computational simulations, and initial exploration of applications.
Year 3. Final analysis, synthesis of results, preparation of research outputs, and dissertation writing.

8. Significance

This research bears substantial implications for both theoretical mathematics and practical applications. By unraveling the Lie group and Lie algebra structures of Toeplitz matrices, it contributes to a deeper comprehension of their mathematical properties. Furthermore, the development of computational tools and algorithms grounded in Lie theory has the potential to advance various fields, including signal processing, quantum information theory, and machine learning [9].

9. References

1. Ma, X., & Wang, Y. (2003). Lie algebraic properties of Toeplitz matrices. “Linear Algebra and its Applications”, 361, 289-299.
2. Zhang, Q., & Pan, H. (2015). On the Lie group structures of Toeplitz matrices. “Journal of Lie Theory”, 25(3), 615-628.
3. Li, J., & Wang, L. (2018). Applications of Lie theory in signal processing using Toeplitz matrices. “Signal Processing”, 143, 200-210.

4. Smith, R., & Johnson, M. (2020). Exploring the Lie algebraic properties of Toeplitz matrices for quantum information processing. “Quantum Information Processing”, 19(5), 1-15.
5. Chen, S., & Liu, H. (2021). Lie theory-based machine learning algorithms for Toeplitz matrix manipulation. “IEEE Transactions on Neural Networks and Learning Systems”, 32(7), 2868-2879.
6. Wu, Y., & Zhang, W. (2021). Lie algebraic characterization of Toeplitz matrices in quantum mechanics. “Physical Review A”, 103(2), 02230.
7. Kim, S., & Lee, J. (2022). A novel approach to signal denoising using Lie group theory and Toeplitz matrices. “IEEE Signal Processing Letters”, 29(3), 225-229.
8. Liang, Q., & Xu, Y. (2022). Lie group-based algorithms for image compression with Toeplitz matrices. “IEEE Transactions on Image Processing”, 31(4), 2156-2168.
9. Yang, H., & Zhang, T. (2022). Exploring Lie group structures of Toeplitz matrices in machine learning applications. “Journal of Machine Learning Research”, 23(6), 237-249.

Serial No. 191523

UNIVERSITY OF EDUCATION, LAHORE

VEHARI CAMPUS

ACADEMIC TRANSCRIPT

Program Name: BS (HONS) MATHEMATICS
Name of Candidate: ANAS ASHRAF
Father's Name MUHAMMAD ASHRAF

Session: Fall 2015-2019
Campus Roll No.: 150107611-40
Registration No.: VR150199

Comprehensive Exam-I Notification No.: 1807/13-11-2017 Comp.Exam. Roll No.: 6458 Result: PASS

Comprehensive Exam-II Notification No.: 2208/26-09-2019 Comp.Exam. Roll No.: 191115 Result: PASS

Course Code	Courses	Cr. Hr.	Max. Marks	Obtained Marks	GP	Grade
Semester - I						
ENGL 2111	English-I	3	100	64	2.30	C+
ISLA 2111	Islamic Studies	2	100	70	3.00	B
COMP 2001	Introduction to Computers	3	100	76	3.30	B+
PHYS 2051	Physics-I	3	100	63	2.30	C+
GEN 1111	Introduction to Psychology	3	100	87	4.00	A
MATH 3011	Calculus-I	3	100	85	4.00	A
Semester - II						
ENGL 2112	English-II	3	100	70	3.00	B
PAKS 2111	Pakistan Studies	2	100	90	4.00	A
MATH 3072	Introduction to Programming Mathematics	3	100	88	4.00	A
PHYS 2052	Physics-II	3	100	81	3.70	A-
GEN 2191	Introduction to Sociology	3	100	82	3.70	A-
MATH 3012	Calculus-II	3	100	75	3.30	B+
Semester - III						
ENGL 2113	English-III	3	100	70	3.00	B
PHYS 2053	Physics-III	3	100	76	3.30	B+
MATH 2193	Object Oriented Programming	3	100	72	3.00	B
MATH 3013	Calculus-III	3	100	77	3.30	B+
MATH 3041	Discrete Structures	3	100	81	3.70	A-
MATH 4141	Analytical Geometry	3	100	79	3.30	B+
Semester - IV						
ENGL 2114	English-IV	3	100	75	3.30	B+
PHYS 2054	Physics-IV	3	100	82	3.70	A-
MATH 2071	Computing Tools for Mathematics	3	100	85	4.00	A
MATH 3061	Ordinary Differential Equations	3	100	71	3.00	B
MATH 3021	Linear Algebra-I	3	100	71	3.00	B
MATH 4120	Introduction to Statistics and Probability	3	100	70	3.00	B
MATH 1200	Guests/Students Seminars	1	100	79	3.30	B+
Semester - V						
MATH 3081	Real Analysis-I	3	100	86	4.00	A
MATH 3031	Group Theory	3	100	70	3.00	B
MATH 4022	Linear Algebra-II	3	100	61	2.30	C+
MATH 3051	Vector and Tensor Analysis	3	100	68	2.70	B-
MATH 3091	Complex Analysis	3	100	82	3.70	A-
MATH 1201	Guests/Students Seminars	1	100	79	3.30	B+
Semester - VI						
MATH 4082	Real Analysis-II	3	100	85	4.00	A
MATH 3071	Number Theory	3	100	72	3.00	B
MATH 4111	General Topology	3	100	67	2.70	B-
MATH 4121	Mathematical Statistics	3	100	76	3.30	B+
MATH 4052	Classical Mechanics	3	100	80	3.70	A-
MATH 1202	Guests/Students Seminars	1	100	81	3.70	A-
Semester - VII						
MATH 4083	Functional Analysis	3	100	80	3.70	A-
MATH 4101	Numerical Analysis-I	3	100	76	3.30	B+
MATH 4025	Rings and Modules	3	100	87	4.00	A
MATH 4062	Partial Differential Equations	3	100	81	3.70	A-
MATH 4143	Introduction to Riemannian Geometry	3	100	73	3.00	B
MATH 1203	Guests/Students Seminars	1	100	90	4.00	A
Semester - VIII						
MATH 4131	Mathematical Methods for Physics	3	100	67	2.70	B-
MATH 4142	Differential Geometry	3	100	80	3.70	A-
MATH 4102	Numerical Analysis-II	3	100	65	2.70	B-
MATH 4033	Advanced Group Theory II	3	100	78	3.30	B+
MATH 4119	Research Project	3	100	83	3.70	A-
MATH 1204	Guests/Students Seminars	1	100	75	3.30	B+
Total		135	4900	3761	-	
Percentage:	76.76 %	CGPA:	3.33	Cumulative Grade:		B+

"Errors and omissions are accepted and bound to be corrected"

Research Project Topic: "Homotopy Perturbation Method for solving fourth order integro-differential equations"

Incharge Internal Examinations
University of Education
Vehari Campus

Principal
University of Education
Vehari Campus

Controller of Examinations
University of Education
Lahore

Prepared By

Checked By

Date 26 SEP 2019

Additional Information

Entry Requirements and Duration

Degree	Entry requirement (years of schooling)	Semesters	Cr. Hrs.
B.A B.Ed / B.Sc B.Ed / or equivalent	12	6	99-100
BBA (Hons)/BS (Hons)	12	8	126
BS (Hons) B.Ed or equivalent	12	10	154-166
M.A/ M.Sc	14	4	66
M.A B.Ed / M.Sc B.Ed or equivalent	14	6	99-102
B.Ed (Elementary / Special education)	14	2	33-36
B.Ed (Secondary)	16	2	33-36
M.Ed	14+1(Bed)	2	[illegible]
MS / M.Phil	16	2 + Thesis	[illegible]

Note: Additional 3 Months Internship

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Grading Scheme/System

For Programs ending 2008

Grade Letter	GPA/Points	Score in %
A	4.00	90 --- Above
A-	3.50	80 --- 89
B	3.00	70 --- 79
B-	2.50	60 --- 69
C	2.00	50 --- 59
C-	1.75	45 --- 49
F	0.00	<45

Ministry of Foreign Affairs, Pakistan
LHR57149st

For Programs starting form 2008

Grade Letter	GPA/Points	Score in %
A	4.00	85 --- 100
A-	3.70	80 --- 84
B+	3.30	75 --- 79
B	3.00	70 --- 74
B-	2.70	65 --- 69
C+	2.30	60 --- 64
C	2.00	55 --- 59
C-	1.70	50 --- 54
D	1.00	40 --- 49
F	0.00	<40

PAKISTAN
FEDERAL GOVERNMENT
RS25
ATTESTATION STAMP

31 MAY 2023

Checked by Mr. Muhammad Shahid
Protocol Officer

Medium of instruction/Examination

English [✓] Urdu [ ] Other [ ]

PAF I&SC, MULTAN
Branch/Trade EDU INST (MATH)
Reg No. M 333-2108-0137
Date 14/04/22 Sig.

Verified by 'A'

Rs.1000
HIGHER EDUCATION COMMISSION PAKISTAN
2647480

MS. UMER AJAZ
Attestation Officer
23 JUN 2022
Higher Education Commission, Regional Center, Lahore
ATTESTED

COMSATS University Islamabad

0092815

TRANSCRIPT

Date: 15-Sep-2022

Certified that **ANAS ASHRAF** s/o **MUHAMMAD ASHRAF** Registration No. **CIIT/FA20-RMT-010/VHR** Department of **Mathematics** has completed and passed all the requisite courses / examinations for the degree of **Master of Science in Mathematics** , on **22nd July 2022** , taught as a **Regular Mode** of study from **Vehari Campus.**

Date of Birth : 08-Jan-1999

The details of the courses passed are as follows:

Course Code	Semester / Course Title	Cr.	LG	CP	Course Code	Semester / Course Title	Cr.	LG	CP
	Fall 2020					**Fall 2021**			
MTH601	Hilbert Space Methods	3	A	11.25	MTH800	Thesis		IP	
MTH612	Numerical Solutions of PDEs I	3	A	10.80		**Spring 2022**			
MTH634	Advanced Modern Algebra with Applications	3	A	11.70					
MTH661	Viscous Fluids I	3	A	10.95	MTH800	Thesis	6+	Approved	
	Spring 2021								
MTH606	Advanced Numerical Analysis	3	A+	12.00					
MTH611	Integral Inequalities	3	A	11.25					
MTH628	Finite Fields	3	A	10.65					
MTH664	Numerical Solutions of PDEs II	3	A+	12.00					

Thesis Title: **Irregularity Indices of Butterfly Networks, Benes Networks and Their Derived Networks**

Total Credit Hours Registered:	**30**
*Discounted Credit Hours:	**0**
Net Credit Hours Passed:	**30**
Total CP:	**90.6**
CGPA+:	**3.78**

+Credit Hours allocated to Thesis are not counted for calculation of CGPA

Controller of Examination

Errors/Omissions Excepted

(Please Turn Over)

EXPLANATORY NOTES

1. The following explanations are to assist the reader with the interpretation of the transcript.
2. The Academic year normally comprises two regular semesters i.e. (16 weeks each) and summer session (8 weeks).
3. English is the medium of instruction.

4. **Legend**

Cr.	Credit of Courses
GP	Grade Point
L.G.	Letter Grade
CGPA	Cumulative Grade Point Average
NC	Non Credit
WD	Withdrawal
*IP	In Progress

*Awarded in the first semester (generally of split semester course) and/or subsequent semesters if the performance of the student was satisfactory. Has no grading and/or credit value for result calculation purpose.

5. **Credit Value Definition**

A course of one credit represents one hour of lecture / three hours laboratory work per week, per semester.

6. **Discounted Credit Hours**

In case of course is repeated due to failure or improvement, its credit hours are counted only once, hence the term "discounted credit hours".

7. **Marks**

a. Each course carries 100 m for mid term, quizzes, assignments, practicals & 50% marks for the terminal examinations
b. Minimum pass marks in e

8. **Grading System**

(Marks %)	(Grade Points)	Letter Grade
90 & Above	4.00	A
89	3.95	
88	3.90	
87	3.85	
86	3.80	
85	3.75	
84	3.70	
83	3.65	
82	3	
81	3	
80	3	
79	3	
78	3	
77	3	
76	3	
75	3.2	
74	3.20	B
73	3.15	
72	3.10	
71	3.05	
70	3.00	
69	2.95	C
68	2.90	
67	2.85	
66	2.80	
65	2.75	
64	2.70	
63	2.65	
62	2.60	
61	2.55	
60	2.50	
59 & Below	0.0	F

Note: This Transcript is iss :on or erasure.

Ministry of Foreign Affairs, Pakistan
LHR57149st

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31 MAY 2023

ATTESTATION STAMP Rs25 GOVERNMENT FEDERAL PAKISTAN

Checked by Mr. Muhammad Shahid
Protocol Officer

Prepared By: _____

Checked By: _____

Syed Muhammad Ali Abbas
Assistant Director (Attestation)
24 FEB 2023
Higher Education Commission
Regional Centre
Government of Pakistan, Lahore

Contact Address:

COMSATS University Islamabad,
Park Road, Tarlai Kalan, Islamabad.
Ph: +92-51-9247000-3
http://www.comsats.edu.pk

Rs.1000
HIGHER EDUCATION COMMISSION PAKISTAN
2882645
ATTESTED

COMSATS University Islamabad
Vehari Campus

Department of Mathematics

Letter of Recommendation

I am writing this letter to give my recommendation for **Mr Anas Ashraf** for admission into your PhD Mathematics program. I have had the pleasure of working with Anas for the past two years as his academic advisor and have been consistently impressed with his intellect, work ethic, and passion for mathematics.

Mr Anas is a brilliant student who has consistently demonstrated a deep understanding of complex mathematical concepts. His ability to analyse and solve problems is excellent, and he has shown a remarkable aptitude for research. His research projects have consistently been of the highest quality, demonstrating a keen ability to think critically and creatively.

In addition to his academic achievements, Mr Anas is an excellent communicator and collaborator. He is always willing to help his peers and has been a valuable member of our department. He has also demonstrated strong leadership skills, serving as the math club president for two years. His ability to work in a team is commendable, and he always makes sure to bring out the best in his team members.

Overall, I am confident that Mr Anas will make a significant contribution to your PhD Mathematics program. He has the intellect, work ethic, and passion for mathematics necessary to excel in this field. I highly recommend him without reservation.

Please do not hesitate to contact me if you require any further information.

Sincerely,

Dr. Hafiz Muhammad Asim Zafar,
Associate Professor of Mathematics,
asimzafar@cuivehari.edu.pk

COMSATS University Islamabad
Vehari Campus

Department of Mathematics

Letter of Recommendation

I am writing this letter to give my recommendation for Mr. Anas Ashraf. I know him as a teacher. Mr. Anas Ashraf first approached me in June 2021 about the possibility of working on a research paper. At our first meeting I described the general outline of the research work, he asked good questions and appeared intelligent. I was quite impressed by his motivation and independence.

Mr. Anas Ashraf demonstrated the ability to work independently with great creativity and enthusiasm.

I was especially taken by Mr. Anas creative mind and independent work ethic. He continued to read the literature independently and generate interesting hypotheses. I think he would be an outstanding asset to your program. I give him my recommendation for pursuing Ph.D.

Dr. Muhammad Imran Qureshi
Associate Professor
Head of Department of Mathematics
E-Mail: imranqureshi@cuivehari.edu.pk
Dated: 14-06-2022

COMSATS University Islamabad Vehari Campus
Mailsi Road, Off Multan Road, Vehari
067-3028346

Recommendation Letter

It gives me an immense pleasure to recommend one of my students **Mr. Anas Ashraf** for a place on the Ph.D program in Mathematics offered at host University. As per my teaching judgment he is enthusiastic, very hardworking and efficient student. He is sharp minded and possess ingenious ability to comprehend analyze and assimilate various concept of Mathematics. Also he has good blend of research capabilities and interest.

I highly recommended him for your esteemed institute with all possible support and assistance. I am very much confident that he will prove himself to be an excellent researcher in accordance with your criteria. Please feel free to contact if further information regarding his qualification or experience directly by email: mwaseem@cuivehari.edu.pk

Thanking You.

Assistant Professor
Department of Mathematics
COMSATS University Islamabad,
Vehari Campus

13/06/2022

Dr. Muhammad Waseem
Assistant Professor,
Department of Mathematics
COMSATS University Islamabad,
Vehari Campus
Pakistan

Ministry of Interior,
Government of Pakistan
requires and requests
in the name of
The President
Islamic Republic of Pakistan
all those to whom it may concern
to allow the bearer
to pass freely without let or hindrance
and to afford the bearer such assistance
and protection as may be necessary
Director General
Immigration and Passports.

G0082183

ISLAMIC REPUBLIC OF
PAKISTAN

PASSPORT

Type: P
Country Code: PAK
Passport Number: PL1840241

Surname: ASHRAF
Given Names: ANAS
Nationality: PAKISTANI
Date of Birth: 08 JAN 1999
Citizenship Number: 36603-7173024-9
Sex: M
Place of Birth: VEHARI, PAK
Father Name: ASHRAF, MUHAMMAD
Date of Issue: 10 JUL 2020
Issuing Authority: PAKISTAN
Date of Expiry: 09 JUL 2025
Tracking Number: 14361262983
Booklet Number: G0082183

P<PAKASHRAF<<ANAS<<<<<<<<<<<<<<<<<<<<<<<<<<<<

PL18402414PAK9901085M2507097366037173024 9<50

ANNOTATIONS

Religion
ISLAM

Previous Passport
N/A

HOLDER'S SIGNATURE OR THUMB IMPRESSION

حامل ہذا کا دستخط یا نشانِ انگوٹھا

NOT VALID WITHOUT SIGNATURE OR THUMB IMPRESSION

یہ پاسپورٹ بغیر دستخط یا نشانِ انگوٹھا ناقابل استعمال ہے۔

G 0082183

یہ پاسپورٹ سوائے اسرائیل کے دنیا کے تمام ممالک کے لئے کارآمد ہے۔

THIS PASSPORT IS VALID FOR ALL COUNTRIES OF THE WORLD EXCEPT ISRAEL.