

Short Bio-data

Detailed Curriculum Vitae (CV) attached

T. M. G. Ahsanullah (Ahsanullah, TMG)

Website :< fac.ksu.edu.sa/tmga1>

Education

- Ph. D, Vrije Universiteit Brussel, VUB, Brussels, BELGIUM, June, 1984; Mathematical Analysis (Fuzzy Topological Groups and Semigroups)
- M.Sc., Dhaka University, 1979
- B.Sc. (Honors), Dhaka University, 1978

Teaching Experience

- Professor (Full), Dhaka University, March 2001-December 2001
- Professor (Full), King Saudi University, January, 2002 till date
- Associate Professor, Dhaka University, July, 1994 - March, 2001
- Assistant Professor, King Saud University, October, 1990 - June, 1994
- Assistant Professor, Dhaka University, December, 1985 - January, 1991 (Promoted to Associate Professor in 1991 in absentia, but joined in July, 1994 after returning from King Saud University, Saudi Arabia)
- Lecturer, Dhaka University, February, 1985 - December, 1985.
- Part time Professor (Part time faculty), North South University (First Private University in Bangladesh)
- Part time Professor, Department of Statistics, Dhaka University (taught Mathematical Analysis to the students of Statistics for two semesters)
- Part time Professor (Part time faculty), Islamic University of Technology, Gazipur, Dhaka (taught Mathematical Analysis for B.Sc. Engineering students, one semester)

Ph. D supervision

1. (Dr.) Jawaher A. Al-Mufarrij, degree conferred in 2009.
 2. (Dr.) Jomana H. Al-Safar, degree conferred in 2013.
- It may be mentioned that I have supervised 12 (twelve) Master thesis students at Dhaka University before joining KSU

Subject taught at KSU

Math # 700(Ph D thesis), Math #600-level courses including Math #690, Math #570, Math #5701, Math #548, Math #580, Math #348, Math #105, Math # 106, Math #107, Math #140, Math #203, Math #204.

Semester I(1436-1437), I taught: Math #204(Differential Equations and Boundary-Value Problems); Math #107(Matrices and Vectors)

Semester II (1436-1437), I taught: Math # 5701(Topology and Geometry, Master Students); Math # 204 (Differential Equations and Boundary-Value Problems); Math #203 (Integral and Differential Calculus).

Semester I: 1437-1438 teaching: Math #106(Integral Calculus) and Math #107(Matrices and Vectors)

Semester II: 1437-1438 teaching: Math #106(Integral calculus) and Math #203(Differential and integral calculus)

Departmental Activities

- Served as coordinator Math 107 for 5 years (between the period 2004-2009)
- Member Topology and Geometry committee
- Member Analysis committee

Editorial Activities

- Member Editorial Board (Mathematics of Uncertainty), Journal of New Mathematics and Natural Computation, World Scientific Publishing
<https://www.worldscientific.com/page/nmnc/editorial-board>
- Member Editorial Board (Fundamental Journal of Mathematics and Mathematical Sciences)
<http://www.frdint.com>
- Member Scientific and technical Committee & Editorial Review Board on Mathematical and Statistical Sciences, World Academy of Sciences, Engineering and Technology
<http://www.waset.org/committees>

Research Activities (Published articles/ submitted articles)

[Please see attached CV (**Section: Research Activities**) for details, **starting from 1985till date**]Published articles arranged below are for the **year 2014-2016 (and a part of 2017) only**

1. Enriched lattice-valued convergence groups (jointly with Professor Dr. David Gauld, Auckland University, New Zealand, Dr. Jawaher Al Mufarrij and Dr. Fawzi AlThukair, KSU), Fuzzy Sets and Systems 238(1)(2014), 71-88. (2014) (ISI)
<http://www.sciencedirect.com/science/journal/01650114/238>

2. Enriched lattice-valued topological groups (jointly with Professor Dr. David Gauld, Auckland University, New Zealand, Dr. Jawaher Al Mufarrij and Dr. Fawzi Al Thukair, KSU).
Publication data: New Math. & Natural Computation 10(1)(2014), 27-53, World Scientific Publishing.
<http://www.worldscientific.com/toc/nmnc/10/01>
3. Probabilistic limit groups under t-norm (jointly with Professor Dr. Gunther Jaeger, University of Applied Sciences, Stralsund, Germany), Topology Proceedings, published by Auburn University, Auburn, Alabama, USA and Nipissing University, North Bay, Ontario, Canada. Top. Proc. 44(2014), 59-74 (E-published on June 3, 2013)
<http://topology.auburn.edu/tp/reprints/v44/>
4. On approach limit groups and their uniformization (jointly with Professor Dr. Gunther Jaeger, University of Applied Sciences Stralsund, Germany), (Appeared electronically on 30th March, 2014.)
Int. Journal of Contemp. Math. Sciences 9(5)(2014), 195-213.
<http://www.m-hikari.com/ijcms/ijcms-2014/5-8-2014/ahsanullahIJCMS5-8-2014.pdf>
5. Probabilistic uniform convergence spaces redefined, Acta Math. Hungari,(jointly with Professor Gunther Jaeger from Germany), vol. 146(2)(2015)376-390.
<http://www.springer.com/mathematics/journal/10474> (2015) (ISI)
6. Lattice-valued quasi-bi-uniformizability of lattice-valued quasi-bi-topological neighborhood groups, Int. J. of Contemporary Math. Sci. 10(6)(2015), 253-268(jointly with Dr. Fawzi Al-Thukair and Dr. Jawaher Al-Mufarrij)
7. Links between probabilistic convergence groups under triangular norms and enriched lattice-valued convergence groups (jointly with Dr. Fawzi Al-Thukair), New Math. & Natural Computation 12(2)(2016), 53-76.
<http://www.worldscientific.com/doi/abs/10.1142/S179300571650006X>
8. Probabilistic uniformization and probabilistic metrization of probabilistic convergence groups (jointly with Professor Gunther Jaeger from **Germany**), **Accepted** for publication (**2016**) to Math. Slovaca (**ISI**)
9. Stratified *LMN*-convergence tower groups and their stratified *LMN*-uniform convergence tower structures (jointly with Professor Dr. Gunther Jaeger from the University of Applied Sciences Stralsund, Germany): Accepted. Fuzzy Sets and Systems (**2017**) <http://dx.doi.org/10.1016/j.fss.2017.01.011> (**ISI**)
10. Complete Heyting algebra-valued convergence semigroups (jointly with Dr. Fawzi Al-Thukair), submitted. (**ISI**)
11. T. M. G. Ahsanullah and Gunther Jaeger, Probabilistic convergence transformation groups, **submitted** (**ISI**)

Reviewer for the various Internal Journals (mostly ISI Journals)

1. Math Reviews (AMS)
2. Zentralblattfur Mathematik(Math Abstract, Germany)
3. International Journal for Fuzzy Sets and Systems, Elsevier Publishing
4. Information Sciences: An International Journal, Elsevier Publishing
5. Kluwer Academic Publishers(Book reviewer)
6. Collectanea Math, Barcelona, Spain
7. Journal of Fuzzy Math (Los Angeles, USA)
8. Arab Journal of Mathematical Sciences (Saudi Mathematical Society)
9. Bulletin Calcutta Math Society
10. Indian Journal of Pure and Applied Mathematics
11. International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems, World Scientific Publishing
12. Journal of New Mathematics and Natural Computation, World Scientific Publishing
13. Journal of Computer Sciences with Applications, Elsevier Publishing
14. De Gruyter Journal of Group Theory
15. Bulletin Malaysian Math Society
16. Journal of Neural Computation and Application, Elsevier Publishing
17. Annals of Fuzzy Mathematics and Informatics
18. Journal of Mathematical and Computer Modeling, Elsevier Publishing
19. Filomat (Serbian Journal of Mathematics)
20. Soft Computing, Springer-Verlag
21. SpringerPlus, Springer-Verlag
22. Quaestiones Mathematica

Member Learned Societies

1. AMS (American Mathematical Society)
2. LMS (London Mathematical Society)
3. CMS(Calcutta Mathematical Society)
4. SMU(Society for the Mathematics of Uncertainty, Department of Electrical and Computer Engineering, Duke University, North Carolina, USA)
5. IEEE(Institute of Electrical and Electronics Engineers-Professional Association for Advancement of Technology)
6. Member, Canadian Mathematical Society
7. Member, Saudi Mathematical Society

Conferences/ Invited Speaker/ Chaired the session/Visiting ship: Please see attached CVfor details

- Participated many conferences organized by Saudi Mathematical Society
- Delivered lectures as an **invited speaker** at various Universities:
 - a) Auckland University, **New Zealand**, 2011
 - b) Sichuan University, Chengdu, **China**, 2011
 - c) Concordia University, Montreal, **Canada**, 2012
- Given **contributed talk** at the conferences at various Universities:
 - a) Hacettepe University Topology Conference, Ankara, **Turkey**, 2009; and **Chaired a session** (Financed by KSU)
 - b) University of Texas, Tyler, **USA**, 2011, Topology and Dynamics Systems Conference(Financed by KSU)
 - c) Attended Joint Meeting(American Mathematical Society), Topological Category Session, Baltimore, Maryland, **USA**, 2014
 - d) Given a talk at the Topology and its Application Conference at Nefpaktos, **Greece**, 2014
 - e) **Attended** at the 49th Spring Topology and Dynamics Systems Conference held at Bowling Green State University, Ohio, **USA** from 14-16 May, 2015 and presented a paper entitled: **On the Category of approach convergence rings**
 - f) **Attended and presented** an article at the **Italian-Spanish Topology Conference**, ItEs2015 held at the Public University of Navarra, Pamplona, **Spain** from July 15- July 18, 2015. The title of the talk: **Probabilistic topological convergence groups**

Member/Research paper Reviewer for Selection Committee for Associate Professor

Worked as reviewer of research paper for the candidate applied for Associate Professorship from different Universities from the Kingdom of **Saudi Arabia** and **Jordan**

Ph. D Thesis Examiner

Worked as Ph. D thesis examiner from various Indian Universities

Research Collaborations/Co-authors

1. Professor Dr. David Gauld, **New Zealand**
2. Professor Dr. Gunther Jaeger, **Germany**

3. Professor Dr.Nehad N. Morsi, **Egypt**
4. Dr. Mohammad Abul Bashar, **Canada**
5. Dr. Fawzi Al-Thukair, **Saudi Arabia**
6. Dr. Jawaher Al-Mufarrij, **Saudi Arabia**
7. Professor Dr. Khodadad Khan, **Bangladesh**
8. Professor ShaplaShrin, **Bangladesh**
9. Professor Dr. Abou Osman Md. Tap, **Malaysia**
10. Professor Dr. M. K. Chakraborty, **India**
11. Professor Dr. S. Ganguly, **India**
12. Dr. MaroufSamhan, **Saudi Arabia**
13. Dr. Asif Qureshi, **Saudi Arabia**

Activities: 2016 (1436-1437) (Conference and Research)

- **Attended and presented** an article entitled: **Probabilistic Convergence Transformation Groups** at the 50th Spring Topology and Dynamical System Conference held on March 10-13, 2016 at the Baylor University, Waco, Texas, USA.

Abstract: Starting with probabilistic convergence structure for probabilistic metric spaces^{1,2} proposed by G. Jäger, and probabilistic convergence groups recently studied by T. M. G. Ahsanullah and G. Jäger³⁻⁶, we introduce and study a notion of probabilistic convergence transformation group over a probabilistic convergence space, generalizing some results of *classical* convergence transformation groups over convergence spaces. The *probabilistic convergence structure* that we used herein this text is linked with R. M. Tardiff's⁷ neighborhood system studied for probabilistic metric spaces.

References

- [1] B. Schweizer and A. Sklar, Probabilistic Metric Spaces, Dover Publications, Inc., New York, 2005.
- [2] G. Jäger, A convergence theory for probabilistic metric spaces, Quest. Math.38 (4)(2015), 587-599.
- [3] T. M. G. Ahsanullah and G. Jäger, Probabilistic uniformization of probabilistic convergence groups and probabilistic metrization of probabilistic convergence groups, submitted.
- [4] G. Jäger and T. M. G. Ahsanullah, Probabilistic uniform convergence spaces redefined, Acta Math. Hungar. 146(2)(2015), 376-390.
- [5] G. Jäger and T. M. G. Ahsanullah, Probabilistic limit groups under a t-norm, Topology Proceedings 44(2014), 59-74.
- [6] G. D. Richardson and D. C. Kent, Probabilistic convergence spaces, J. Australian Math. Soc. Ser A 61(3)(1996), 400-420.
- [7] R. M. Tardiff, Topologies for probabilistic metric spaces, Pacific J. Math. 65(1976), 233-251.

- **Given a talk at the Departmental Seminar on “Regarding probabilistic metrization of probabilistic convergence groups, an application and some open problems” on 18th May, 2016.**
- **Abstract Accepted for presentation at the 31st Summer Conference on Topology and its Application to be held at the University of Leicester, United Kingdom from August 2-5, 2016.**

Abstract: The idea of stratification mapping between frames $L(=\left(L, \leq, \vee\right))$ and $M(=\left(M, \leq, \vee\right))$ introduced and intensively studied by Jäger in [1] for LMN -convergence tower spaces. With this stratification mapping, we introduce a notion of s -stratified LMN -convergence group, $N(=\left(N, \leq, \ast\right))$ being a quantale [2]. While achieving various results, we provide with a variety of motivating examples, some of which are attached to Lowen-Lowen approach convergence spaces [3], Herrlich-Zhang probabilistic convergence spaces [4], Preuss's convergence spaces [5], and probabilistic convergence spaces under so-called triangle function τ on the set of all distance distribution functions Δ^+ studied in [6].

References

- [1] G. Jaeger, Stratified LMN -convergence tower spaces, Fuzzy Sets and systems **282**(2016), 62-73.
- [2] P. T. Johnstone, Stone Spaces, Cambridge University Press, 1982.
- [3] E. Lowen and R. Lowen, A quasitopos containing CONV and MET as full subcategories, Internat. J. Math. Math. Sci. **11**(1988), 417-438
- [4] H. Herrlich and D. Zhang, Categorical properties of probabilistic convergence spaces, Appl. Categ. Struct. **6**(1998), 495--513.
- [5] G. Preuss, Foundations of Topology, Kluwer Academic Publishers, 2002.
- [6] T. M. G. Ahsanullah and G. Jaeger, Probabilistic uniformization and probabilistic metrization of probabilistic convergence groups, to appear in Math. Slovaca.

- **Attended and presented a paper at the Algebra, Topology and Analysis Conference held in Cacak, Serbia July 5-9, 2016.**
- **Abstract:** Considering a complete Heyting algebra \mathbf{H} , we introduce a notion of stratified \mathbf{H} -generalized convergence semigroup, generalizing a notion on stratified enriched lattice-valued convergence groups [1]. We develop basic theory on the subject, besides obtaining conditions under which a stratified \mathbf{H} -generalized convergence semigroup is a stratified \mathbf{H} -generalized convergence group.
We supply a good number of natural examples which include among others, ultra approach convergence semigroups [3], Herrlich-Zhang probabilistic convergence semigroups [4], and stratified \mathbf{H} -generalized convergence semigroups arising from \mathbf{H} -convergence structures, such as structures of pointwise convergence, and continuous convergence on function spaces [5,6].

References

- [1] T. M. G. Ahsanullah, David Gauld, Jawaher Al-Mufarrij and Fawzi Al-Thukair, Enriched lattice-valued convergence groups, Fuzzy Sets and Systems

238(2014), 71--88.

G. Jaeger, Subcategories of lattice-valued convergence spaces, *Fuzzy Sets and Systems* **156**(2005), 1--24.

R. Lowen and B. Windels, Approach groups, *Rocky Mountain, J. Math.* **30** (2000), 1057--1073.

[4] H. Herrlich and D. Zhang, Categorical properties of probabilistic convergence spaces, *Appl. Categ. Struct.* **6**(1998), 495--513.

[5] G. Jaeger, Compactness in lattice-valued function spaces, *Fuzzy Sets and Systems* **161**(2010), 2962--2974.

[6] G. Jaeger, Connectedness and local connectedness for lattice-valued convergence spaces, *Fuzzy Sets and Systems* (2016), <http://dx.doi.org/10.1016/j.fss.2015.11.013>.

Latest Research Update: Working on a project relating to **Quantale-valued approach structures** and on the **Categories of probabilistic convergence transformation groups** in collaboration with Professor Dr. Gunther Jaeger from University of Applied Sciences Stralsund, **Germany**.

Paper accepted to give a talk at the upcoming conference at Dayton University, Ohio, USA from June 24-30, 2017

Abstract:

Quantale-valued gauge groups and approach convergence transformation groups

E. Colebunders, et al., introduced a category **C** [3], consisting of objects all triple (X, S, δ) , where $X \in |\mathbf{CAP}|$, an object in the category of Lowen-approach spaces [8], $S \in |\mathbf{CAG}|$, an object in the category of approach groups [9], and $\delta: X \times S \rightarrow X$, a contraction mapping. Actually, in [3], the authors brought to light a concept of approach convergence *transformation* monoids without explicit mention. On the other hand, following the idea of probabilistic convergence group [1] (see also [5]), we introduced a category of probabilistic convergence transformation groups, **PCONVTG** [2]. Our motive here is to demonstrate the link between these two categories. In so doing and, failing to provide a direct link between these two, apparently different approaches, we consider a *value quantale* **V** in the line of [6, 7] (see also [4], with opposite order), and propose a notion of quantale-valued gauge group (en route to a category **V-CONVTG**) - a notion closely related to quantale-valued metric group vis-à-vis quantale-valued convergence group. The advantage that we have using **V-CONVTG** is, it provides a global framework, where **C**, like many others existing categories of similar nature, serve examples whenever appropriate quantales are considered.

References

[1] T. M. G. Ahsanullah and G. Jäger, Probabilistic uniformizability and probabilistic metrizable of probabilistic convergence groups, to appear in *Mathematica Slovaca*.

[2] T. M. G. Ahsanullah and G. Jäger, Probabilistic convergence transformation groups, submitted for publication, preprint, 2017.

[3] E. Colebunders, H. Boustique, P. Mikusiński, G. Richardson, Convergence approach spaces:

Actions, *Applied Categorical Structures* **24**(2016), 147-161.

[4] R. C. Flagg, Quantales and continuity spaces, *Algebra Univers.* **37**(1997), 257-276.

[5] G. Jäger, A convergence theory for probabilistic metric spaces, *Quaest. Math.* **3**(2015), 587-599.

[6] G. Jäger and W. Yao, Quantale-valued gauge spaces, to appear in *Iranian Journal of Fuzzy Systems*.

[7] H. Lai and W. Tholen, Quantale-valued approach spaces via closure and convergence, arXiv:1604.08813.

[8] R. Lowen, Approach Spaces: The Missing Link in the Topology-Uniformity-Metric Triad, Clarendon Press, Oxford, 1997. Index Analysis, Springer, 2016.

[9] R. Lowen and B. Windels, Approach groups, *Rocky Mountain J. Math.* **30**(2000), 1057-1073.

Invited speaker at the upcoming 3rd International conference on Fuzzy Systems and Data Mining to be held at the National Dong Hwa University, Taiwan, November 24—27, 2017

Speech Title: Lattice-valued Convergence Groups and Various Lattice-valued Transformation Groups

Abstract: Since the inception of Zadeh's seminal paper on fuzzy sets, enormous work has been undertaken over more than 50 years both from theoretical and application point of view. Fuzzy convergence spaces or in terms of present day terminology Lattice-valued convergence spaces/Many-valued convergence spaces, a supercategory of the category of topological spaces, where a good amount of research being done over the years by many authors. Following a notion of L-fuzzy convergence spaces, L being a complete Heyting algebra, attributed to G. Jaeger, we reached to a category of enriched lattice-valued convergence groups and most recently, arrived a step forward to an article entitled Stratified LMN-convergence tower groups and their stratified LMN-uniform convergence tower structures, where L, M are frames and N is a quantale. In this present talk, first, we give an overview of the recent development of lattice-valued convergence theories in conjunction with algebraic structures, and secondly, we focus on L-continuity groups, where the idea of continuity is due to R. Flagg's quantales and continuity, and their various connections to L-convergence groups, L being a value quantale. Finally, we explore the possible link of some of the preceding items, such as, quantale-valued convergence structures as well as quantale-valued metric spaces in conjunction with algebraic structures to theoretical computer science en route to domain theory.

Updated on March 7, 2017.

Curriculum Vitae (CV)

Name: T. M. G. AHSANULLAH (AHSANULLAH, TMG)

Address: (Official) Department of Mathematics, College of Science, King Saud University, Riyadh 11451, Saudi Arabia

Address in home country: House # 2, Road # 15, Sector # 7, Uttara Model Town, Dhaka – 1200, Bangladesh

Telephone: +966-11-4675177

Fax : +966-11-4676512

E-Mail Address: tmga1@ksu.edu.sa

Website: <http://fac.ksu.edu.sa/tmga1>

Present Position: University Professor

Marital Status: Married to Kishwar Sultana (Lily) with 3 children: Safwan Ahsan, Sumaiya Ahsan (Bushra), Arsh Ahsan.

Education

- From October 1979 to April 1984 worked as a doctoral research fellow at VrijeUniversiteit Brussel, Belgium under the Fellowship from the Ministry of Higher Education and Dutch Culture, Government of Belgium, specializing Fuzzy Topological Structures on Groups and Semigroups, generalizing Topological Structures on Groups and Semigroups leading to Ph. D degree.
- Obtained Doctor of Science (Ph. D) degree in Mathematical Sciences (Pure Mathematics), VrijeUniversiteit Brussel, 27th June 1984.
Title of the Ph. D thesis: On Fuzzy Topological Groups and Semigroups.
Title of the Annex thesis: Generalization of classical Urysohn lemma for normal topological spaces.
- Obtained a Scholarship (NST Fellowship) from the Ministry of Science and Technology, Government of People's Republic of Bangladesh in mid-1979 for doing research leading to M. Phil degree attached to the Department of Mathematics, University of Dhaka but a few months later obtained a scholarship from Belgium Government for higher studies.
- Master of Science degree in Pure Mathematics, University of Dhaka, 1976 (Examination held in early 1979) (Subject taken: Topology, Real Function Theory, Theory of Numbers, and Theory of Groups).
- Bachelor of Science (Honors) degree in Mathematics, University of Dhaka, 1975 (Examination held in 1977).
- Higher Secondary School Certificate Examination, Dhaka, 1972 (Examination held in 1973).

- Secondary School Certificate Examination, Board of Intermediate and Secondary Education, Rajshahi (Bangladesh), 1970.

Teaching Experience

- Joined the Department of Mathematics, University of Dhaka on February 2, 1985 as Lecturer
- Appointed as Assistant Professor at the Department of Mathematics, University of Dhaka, December, 1985
- Promoted to the rank of Associate Professor at the Department of Mathematics, University of Dhaka in June 1991 (in absentia while serving King Saud University)
- Joined the Department of Mathematics, King Saud University, Riyadh, Saudi Arabia (with extraordinary leave from Dhaka University, Bangladesh) as Assistant Professor on 26th October 1990 and served this department till June 26, 1994
- Rejoined at the Department of Mathematics, University of Dhaka (at the end of extraordinary leave taken from the University of Dhaka in 1990) as Associate Professor on 16th July 1994
- Promoted to the position of Professor of Mathematics on 27th March, 2001 at the Department of Mathematics, University of Dhaka
- Joined at the Department of Mathematics, King Saud University, Riyadh, Saudi Arabia as a Professor of Mathematical Sciences on 29th January 2002
- Served as part time Professor of Mathematics at the North South University, Dhaka, Bangladesh to teach Mathematics for the students of Computer Sciences, Business Administration and Environmental Sciences
- Served as part time Professor of Mathematics at the Department of Statistics, University of Dhaka, Bangladesh to teach Mathematical Analysis to the students of Statistics.

Teaching the following courses

- **King Saud University**
 - Math #700 (Ph. D thesis)
 - Math #600 level courses for Ph. D students
 - Math #5701 (Topology and Geometry, Master students)
 - Various courses on Math #500 level for Master students mainly Topology, Measure Theory, and Many-valued topology and its Applications
 - Math #548 (Mathematics of Fuzzy Sets and Applications)
 - Math #373 (Elementary Topology) (One semester)
 - Math #348 (Real Analysis II) (Women College)
 - Math #140 (Foundation course of beginners)
 - Math # 105 (Differential calculus)
 - Math #106 (Differential and Integral Calculus)

- Math #107 (Linear algebra, Vectors and Calculus)
- Math #109 for Pharmacy students,
- Math #203 (Multivariable Calculus)
- Math #204 (Differential Equation and its Applications).

- **Dhaka University**

- Topology at the postgraduate and undergraduate levels
- Fuzzy Topology at M Phil level
- Fuzzy Mathematical techniques at the Master degree level
- Real Analysis
- Advanced calculus at Master (Part I) level
- Mathematical Methods
- Differential Equations and Boundary Value Problems
- Mathematical Analysis at Honors level
- Also taught various courses for subsidiary and minor students of:
Computer Sciences; Physics; Applied Physics and Electronics; Chemistry; Biochemistry;
Soil Science; Statistics; Geography; Industrial Arts; Psychology; Geology

- **North South University**

- Math #112 (Foundation course in Mathematics)
- Math #125 (Elementary Linear Algebra and its Applications)
- Math #120 (Calculus I)
- Math #130 (Calculus II)
- Math #240 (Calculus III)
- Math # 250 (Calculus IV)

Present Research Interest

Primary Interest: General Topology/Set-Theoretic Topology, Probabilistic Topological Groups, Probabilistic Convergence Groups

Secondary Interest: Lattice-Valued Topology (Lattice-Valued Topological Groups).

AMS Sub Class: 54H11, 54E15, 54 A 20, 18 B 30; 54A40

Interested in Particular: Probabilistic Metric Spaces, Probabilistic Convergence Group Theory, Uniformization, Metrization, Approach Group Theory, Approach Convergence Group Theory. Topological groups, Convergence Groups, Application of Convergence Structures to Functional Analysis, Convenient Topology, Category.

Editorial Activities

- Member of the Editorial Board (Mathematics of Uncertainty): New Mathematics and Natural Computation, World Scientific Publishing

<http://www.worldscientific.com/page/nmnc/editorial-board>

- Member of the Editorial Board (Fundamental Journal of Mathematics and Mathematical Sciences)
<http://www.frdint.com>
- Member Scientific and Technical Committee & Editorial Review Board on Mathematical and Statistical Sciences, World Academy of Sciences, Engineering and Technology
<http://www.waset.org/committees>

Ph. D Thesis Supervision

1. Jawaher Al-Mufarrij (degree obtained, 2009)
2. JomanaBinte Hussein Ali Al-Safar (degree obtained, 2013)

Countries visited mostly academic purpose

Belgium, the Netherlands, Luxemburg, Germany, France, U. K., Saudi Arabia, U.S.A., United Arab Emirates, Turkey, China, Malaysia, India, Qatar, Bahrain, New Zealand, Canada, and Greece, Spain.

Research Activities/Published Articles

1. T. M. G. Ahsanullah, Some results on fuzzy neighborhood spaces, J. Pure Manuscript **4**(1985), 97-106.
2. T. M. G. Ahsanullah, Separation axioms in fuzzy neighborhood spaces, Bull. Malaysian Math. Soc. **9**(10)(1986), 27-31.
3. T. M. G. Ahsanullah, on fuzzy neighborhood groups, J. Math. Anal. Appl. **130**(1988), 237-251.
4. Abu Osman M. T. and T. M. G. Ahsanullah, On fuzzy subsemigroups via triangular norms **18**(4)(1989), 29-35.
5. T. M. G. Ahsanullah and S. Ganguly, on fuzzy neighborhood rings, International J. Fuzzy Sets and Systems **34**(1990), 255-260.
6. T. M. G. Ahsanullah, on fuzzy neighborhood modules and algebras, International J. Fuzzy Sets and Systems **35**(1990), 219-229.
7. T. M. G. Ahsanullah, on the small invariant fuzzy neighborhood groups, Calcutta Math. Soc. **84**(1992), 457-464.
8. M. K. Chakraborty and T. M. G. Ahsanullah, Fuzzy topologies on fuzzy sets and tolerance topologies, International J. Fuzzy Sets and Systems **45**(1992), 103-108.

9. T. M. G. Ahsanullah and N. N. Morsi, Invariant probabilistic metrizableability of fuzzy neighborhood groups, *International J. Fuzzy Sets and Systems* **47**(1992), 233-245.
10. A. F. M. Khodadad Khan and T. M. G. Ahsanullah, Sequential convergence in fuzzy neighborhood spaces, *International J. Fuzzy Sets and Systems* **46**(1992), 115-120.
11. A. F. M. Khodadad Khan and T. M. G. Ahsanullah, Some properties of fuzzy neighborhood normed linear spaces, *International J. Fuzzy Sets and Systems* **54**(1993), 333-339.
12. T. M. G. Ahsanullah and Fawzi Al-Thukair, Conditions on a semigroup to be a fuzzy neighborhood group, *International J. Fuzzy sets and Systems* **55**(1993), 330-340.
13. T. M. G. Ahsanullah and Fawzi Al-Thukair, A characterization of fuzzy neighborhood commutative division rings, *International J. Math. Math. Sci.* **16**(4)(1993), 709-716.
14. Marouf Samhan and T. M. G. Ahsanullah, Fuzzy congruences on groups and rings, *International J. Math. Math. Sci.* **17**(3)(1994), 469-474.
15. T. M. G. Ahsanullah and Fawzi Al-Thukair, Characterization of fuzzy neighborhood commutative division rings II, *International J. Math. Math. Sci.* **18**(2)(1995), 323-330.
16. T. M. G. Ahsanullah and Marouf Samhan, On the N-topological right quasi-regularity in N-rings, *J. Fuzzy Math. (International Fuzzy Mathematics Institute, Los Angeles)* **3**(2)(1995), 273-283.
17. T. M. G. Ahsanullah, Strictly minimal fuzzy neighborhood division rings, *International J. Fuzzy Sets and Systems* **78**(1996), 371-380.
18. M. A. Qureshi and T. M. G. Ahsanullah, Compactness and some characterizations of fuzzy neighborhood algebraic structures, *J. Fuzzy Math. (International Fuzzy Mathematics Institute, Los Angeles, USA)* **4**(4)(1996), 815-828.
19. T. M. G. Ahsanullah, Minimal locally bounded fuzzy neighborhood commutative division rings, *International J. Fuzzy Sets and Systems* **87**(1997), 87-97.
20. A. F. M. Khodadad Khan and T. M. G. Ahsanullah, Net-convergence in fuzzy neighborhood spaces, *International J. Fuzzy Sets and Systems* **101**(2000), 197-203.
21. T. M. G. Ahsanullah, Cauchy-nets in fuzzy neighborhood Abelian groups, rings and modules, *J. Bang. Acad. Sci.* **24**(2000), 212-134.
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42. T. M. G. Ahsanullah and Fawzi Al-Thukair, N-topo nilpotency in fuzzy neighborhood rings, *International J. Math. Math. Sci.* **13**(2004), 679-696.
43. T. M. G. Ahsanullah, M. A. Bashar and S. Shirin, Fuzzy topological divisor of zero in a fuzzy neighborhood rings, *J. Algebras, Groups and Geometries (Hadronic Press, Palm Harbor, Florida, USA)* **22**(2005), 457-472.
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47. T. M. G. Ahsanullah and Fawzi Al-Thukair, Change of basis for lattice-valued convergence groups, *New Math. and Natural Computation* **7**(3) (2011), 453-469, World Scientific Publishing.
48. J. Al-Mufarrij and T. M. G. Ahsanullah, On the relationships between various lattice-valued topological groups and their uniformities, *New Math. & Natural Computation*, **8**(3)(2012), 361-38
49. T. M. G. Ahsanullah, David Gauld, Jawaher Al-Mufarrij and Fawzi Al-Thukair, Enriched lattice-valued convergence, *International J. of Fuzzy Sets and Systems* **238**(1)(2014), 71-88.
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51. Gunther Jaeger and T. M. G. Ahsanullah, Probabilistic limit groups under t-norm (jointly with Gunther Jaeger, University of Applied Sciences, Stralsund, Germany), *Topology Proceedings*, published by Auburn University, Auburn, Alabama, USA and Nipissing University, North Bay, Ontario, Canada. Publication Data: *Top. Proc.* **44**(2014), 59-74. (E-published on June 3, 2013)
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55. T. M. G. Ahsanullah and Fawzi Al-Thukair, Links between probabilistic convergence groups under triangular norms and enriched lattice-valued convergence groups, *New Math. & Natural Computation*, World Scientific Publishing. Accepted (To appear in July issue, 2016)
56. T. M. G. Ahsanullah and Gunther Jaeger, Probabilistic uniformization and probabilistic metrization of probabilistic convergence groups, **accepted** for publication to **Mathematica Slovaca**.
57. T. M. G. Ahsanullah and Gunther Jaeger, Stratified *LMN*-convergence tower groups and their stratified *LMN*-uniform convergence tower structures, *Fuzzy Sets and Systems* <http://dx.doi.org/10.1016/j.fss.2017.01.011>
58. T. M. G. Ahsanullah and Fawzi Al-Thukair, Complete Heyting Algebra-valued convergence semigroups, **submitted**.
59. T. M. G. Ahsanullah and Gunther Jaeger, Probabilistic convergence transformation groups, **submitted**.

Reviewer

1. Mathematical Reviews (American Mathematical Society) (Reviewer)
2. Zentralblatt fur Mathematik (Mathematics Abstract) (Springer Verlag, Berlin)(Reviewer) (76 articles reviewed as of today)
3. International Journal for Fuzzy Sets and Systems (Elsevier Publishers)
4. Information Sciences: An International Journal (Elsevier Publishers)
5. Kluwer Academic Publishers (Book Reviewed)
6. *Collectanea Mathematica*, Universite de Barcelona, Spain
7. *Journal of Fuzzy Mathematics*, International Fuzzy Mathematics Institute, Los Angeles, USA
8. *Arab Journal of Mathematical Sciences* (Saudi Mathematical Society)
9. *Bulletin Calcutta Mathematical Society*, India
10. *Indian Journal of Pure and Applied Mathematics*
11. *International Journal of Uncertainty, Fuzziness and Knowledge-Based Systems*, World Scientific Publishing
12. *Journal of New Mathematics and Natural Computations*, World Scientific Publishing
13. *Journal of Computers and Mathematics with Applications*, Elsevier Publishing

company,

14. De Gruyter Journal of Group Theory, Germany
15. Bulletin Malaysian Mathematical Society, Kuala Lumpur, Malaysia
16. Journal of Bangladesh Mathematical Society: GANIT
17. Dhaka University Science Journal, Bangladesh
18. Journal of Shah Jalal University of Science and Technology (Bangladesh)
19. Bangladesh Journal of Science and Technology
20. Rajshahi University Studies (Bangladesh)
21. Journal of Neural Computation and Application, (Elsevier Publishers)
22. Journal of Mathematics and Statistics, Hecettepe University, Ankara, Turkey
23. Tripura University Mathematics Journal, Tripura, India
24. Annals of Fuzzy Mathematics and Informatics, South Korea
25. Journal of Mathematical and Computer Modelling (Elsevier Publishers)
26. Journal of Mathematics and Computer Sciences
27. Filomat (Serbian Journal on Mathematics)
28. Soft Computing, Springer-Verlag
29. SpringerPlus, Springer-Verlag
30. Quaestiones Mathematica

Supervisor/ Examiner/ Academic Responsibilities

A. Supervised Ph D student: Dr. Jawaher Al-Mufarrij , Department of Mathematics, Women Section at the King Saud University, obtained degree on 19th April, 2009.

Title of the Ph. D thesis: On the Subcategories of Frame Valued Topological Groups and Generalized Convergence Groups

Abstract: Considering \mathcal{L} a frame, first we introduced within the framework of Hohle-Sostak lattice-valued topological structures, the notion of \mathcal{L} -neighborhood topological groups, and stratified \mathcal{L} -neighborhood topological groups which are objects from the subcategories of the category of \mathcal{L} -topological groups. We studied their fundamental properties and provided with characterization theorems. In doing so, we looked into some related structures, such as, initial, final and quotient stratified \mathcal{L} -neighborhood topological groups. We showed that the category of \mathcal{L} -neighborhood topological groups and \mathcal{L} -continuous group homeomorphisms, $\mathcal{L}\text{-NTopGrp}$ is topological over the category of groups, \mathbf{Grp} with respect to forgetful functor. We settled down one of the crucial issues that every stratified \mathcal{L} -neighborhood topological group is \mathcal{L} -uniformizable. This is done for the first time within the unified approach of \mathcal{L} -uniform spaces attributed to Gutierrez Garcia, De Prada Vicente, and Sostak. In this respect, we obtained various \mathcal{L} -uniformities of stratified \mathcal{L} -neighborhood topological groups, such as, left, right, infimum and supremum. Considering quotient \mathcal{L} -uniformity due to Garcia, we looked into its impact with quotient stratified \mathcal{L} -neighborhood topological groups. Introducing the notions of \mathcal{L} -equicontinuity, \mathcal{L} -uniform equicontinuity and balanced stratified \mathcal{L} -neighborhood topological groups in appropriate spaces, we provided with various

results along with some canonical examples. Here, we gave characterization theorems on balanced stratified SL -neighborhood topological groups and obtained a full subcategory $BSSL$ - $NTopGrp$ of balanced stratified SL -neighborhood topological groups and SL -continuous group homeomorphisms, of the category SLL - $TopGrp$ of stratified SL -topological groups. We derived the relationship between SL -neighborhood topological groups with various SL -topological groups, and set relationship between uniformities they inherit.

Finally, following the notion of stratified SL -fuzzy convergence space of Gunther Jager, we introduced which we believe to be a new notion, the notion of stratified SL -generalized convergence group. By dropping the topological condition from the notion of SL -neighborhood topological system, we introduced the notion of stratified SL -neighborhood groups, and studied some other intimately related objects, mainly, stratified SL -Kent convergence groups, and stratified SL -principal convergence groups. We showed that the category of stratified SL -principal convergence groups, SLL - $GCGrp$ is topological over the category of groups, Grp with respect to the forgetful functor, and we observed that the category SLL - $NeighGrp$, of stratified SL -neighborhood groups is isomorphic to a subcategory of SLL - $GCGrp$. We give necessary and sufficient conditions for a group structure and a stratified SL -generalized convergence structure to be stratified SL -generalized convergence groups. We showed that every stratified SL -generalized convergence group possessing a stratified SL -principal convergence structure gives rise to a stratified SL -neighborhood topological group. We ended up by stating a nicer relationship that exist among the subcategories of stratified SL -neighborhood topological groups and newly founded objects in the domain of stratified SL -generalized convergence groups.

Keywords: Frame, lattice-valued topology, topological group, uniform space, generalized convergence group, category.

AMS Subject Classification (2000): 54A40, 54E15, 54H11, 54A20, 18B30.

B. Supervised Ph D student: Dr.Jomana Hussein Ali Al-Safar

Degree obtained April, 2013.

Title of the Ph D thesis: Subcategories of Stratified Lattice-Valued Semiuniform Convergence Groups and Change of Basis Lattice, 2012.

C. Supervised M. Sc thesis: Dhaka University, Bangladesh

1. ShaplaShrin (A Study on Fuzzy Neighborhood Linear Spaces)
2. Mohammad Parvez (Fuzzy Measure Theory)
3. Shirajul Islam (Equivalent Uniformities in Topological Groups)
4. RafiqAmer (On the category of Topological Transformation Groups)
5. Gautom Pal (Equivalent Uniformities and Measurability in Topological Groups)
6. M. A. Bashar (On Fuzzy Neighborhood Order Spaces)
7. Morari Mohan Das (Some Results on Fuzzy Groups)
8. M Farid Uddin (A Study of Ultracompletion of Fuzzy Neighborhood Linear Spaces)
9. Mostaq Ahmad (On Some Fuzzy Algebraic Structures)

10. Jubaida Begum (On Different Types of Fuzzy Operators)
11. Mahbul Khan (A Study on Various t-norms)
12. Sharifullah Majumdar (On the Subcategories of Topological Groups and Many Valued Topological Spaces)

- D. Examined M Phil Thesis for a student of Dhaka University
- E. Examined Ph D Thesis from Various Universities from India
- F. Performed responsibilities as chairman and member of different examination committee at Dhaka University
- G. **Served as coordinator of Math # 107** at the Department of Mathematics, King Saud University
- H. External member of selection committee for Associate Professor and Professor, various universities from different countries including different Universities in Saudi Arabia.

Member of Different Learned Societies

1. American Mathematical Society (Reciprocity Membership)
2. Bangladesh Mathematical Society (Life Member)
3. Calcutta Mathematical Society (Life Member)
4. London Mathematical Society (Reciprocity Member)
5. Saudi Mathematical Society (Ordinary Membership)
6. SMU - Society for the Mathematics of Uncertainty, Department of Electrical and Computer Engineering, Duke University, North Carolina, USA
7. IEEE (Institute of Electrical and Electronics Engineers -The World's Largest Professional Association for the Advancement of Technology)
8. Canadian Mathematical Society

Invited Speaker/ Visiting ship/Paper Accepted for Presentation/Paper Presented at the Conference

1. Delivered lecture on Fuzzy Mathematics at the National Center of Knowledge-Based Computing at the Statistical Institute of India, Calcutta, West Bengal, India, 1987.
2. Delivered lecture at the Department of Pure Mathematics, Ballygang Circular Road, Calcutta University, West Bengal, India, jointly sponsored by the University Grant Commission, Bangladesh and Indian Society for Fuzzy Mathematics and Information Processing, 1987.
3. Delivered lecture at the Department of Applied Mathematics, Calcutta University, West Bengal, India, 1987.
4. Given two seminars on Fuzzy Topologies and Topological Algebraic Structures at the Department of Mathematics, College of Science, King Saud University, Riyadh, Saudi Arabia, November-December, 1990.
5. Given a talk on Fuzzy Topologies on Algebraic Structures at the King Fahd University of Petroleum and Minerals, Dhahran, Saudi Arabia, November, 1992.
6. Delivered lectures on Fuzzy Mathematics and its Applications, Paper presented at the International Conference organized by the Saudi Association of Mathematical Sciences, Riyadh, April 5-7, 1994.

7. Delivered lectures at the International Seminar at the Department of Mathematics on Fuzzy Mathematics sponsored by the Bangladesh Mathematical Society and University of Dhaka.
8. Delivered lectures at the symposium and annual conferences held at different Universities in Bangladesh.
9. Presented paper at the International Conference held at Prince Sultan University of Science and Technology, Riyadh, Saudi Arabia, 2003.
10. Presented paper at the International Conference on Mathematics and its Application at Sharjah University, United Arab Emirates, 2004.
11. Presented paper at the Saudi International Conference of Science and Technology, Riyadh, Saudi Arabia, 2006.
12. Presented paper at the International Conference on Mathematics and its Applications at Sharjah, United Arab Emirates, 2007.
13. Chaired a scientific session at the International Conference on Mathematics and its Application at Sharjah, United Arab Emirates, 2007.
14. T. M. G. Ahsanullah, Continuous action of stratified lattice-valued convergence groups (2nd International Conference on Mathematical Analysis, Putra World Trade Center, Kuala Lumpur, Malaysia, 30 Nov.3 Dec., 2010; Abstract Accepted.)
Abstract: Using the ideas of stratified lattice-valued convergence structure attributed to G. Jaeger [A category of L -fuzzy convergence spaces, Quaest. Math. 24(2001), 501-517], and stratified frame-valued generalized convergence group introduced in [T. M. G. Ahsanullah and Jawaher Al-Mufarrij, Frame-valued stratified generalized convergence groups, Quaest. Math. 31(2008), 279-302], we present here a notion of continuous action of stratified lattice-valued convergence group on stratified lattice-valued convergence space. We discuss how stratified lattice-valued convergence group act continuously on a set of continuous functions bestowed with stratified lattice-valued convergence structure of continuous convergence of Jaeger. Finally, we show that there exists a one-to-one correspondence between the homeomorphic representation of stratified lattice-valued convergence group and its continuous actions on a stratified lattice-valued limit space [G. Jaeger, Subcategories of lattice-valued convergence spaces, International J. Fuzzy Sets and Systems 156(2005), 1-24.]
15. Jawaher Al-Mufarrij and T. M. G. Ahsanullah, On the category of L -fuzzy neighborhood groups and its connections with various categories of L -convergence groups (International Conference on Topology and its Application, Nafpaktos, Greece, June 26-30, 2010; Abstract Accepted.)
Abstract: Motivated by the notion of L -fuzzy neighborhood system attributed to U. Hohle and A. P. Sostak [Axiomatic foundations of fixed basis fuzzy topology, in: Mathematics of Fuzzy Sets: Topology, Logic and Measure Theory, Edited by U. Hohle and S. E. Rodabaugh, Kluwer Academic Publishers, Dordrecht, 1999], we introduce for a frame L , categories $S L$ -FNeighGrp, of stratified L -fuzzy neighborhood groups, and $S L$ -FIntGrp, of stratified L -fuzzy interior groups. We show that these two categories are isomorphic; some basic facts along with some characterization theorems are presented. Considering the notion of stratified L -pre-topological convergence space due to H.

Boustique, R. N. Mohapatra and G. Richardson [Lattice-valued fuzzy interior operators, *International J. Fuzzy Sets and Systems* 160(2009), 2947-2955], we show that the category $S\mathbb{L}\$-P\text{-TopConvGrp}$, of stratified $\mathbb{L}\$$ -pre-topological convergence groups, is isomorphic to the category $S\mathbb{L}\$-F\text{NeighGrp}$. Also, considering a full subcategory $S\mathbb{L}\$-F\text{NeighGrp}'$, we show that this category is isomorphic to a subcategory of the category $S\mathbb{L}\$-G\text{ConvGrp}$, of stratified $\mathbb{L}\$$ -generalized convergence groups [T. M. G. Ahsanullah and Jawaher Al-Mufarrij, Frame-valued stratified generalized convergence groups, *Quaest. Math.* 31(2008), 279-302]; the key item of this category is the notion of stratified $\mathbb{L}\$$ -generalized convergence structure initiated by G. Jager [A category of $\mathbb{L}\$$ -fuzzy convergence spaces, *Quaest. Math.* 24(2001), 501-517]. Finally, we propose two more categories $HS\text{-}S\mathbb{L}\$-FFil$, of Hohle-Sostakstraified $\mathbb{L}\$$ -fuzzy filter spaces, and $HS\text{-}S\mathbb{L}\$-FFilGrp$, of stratified $\mathbb{L}\$$ -fuzzy filter groups, and discuss some of their features

16. Jawaher Al-Mufarrij and T. M. G. Ahsanullah, On the relationship between various lattice-valued topological groups and their uniformities, Presented at the International Conference on Topology and its Applications at Hacettepe University, Ankara, Turkey held on July 6-11, 2009; the session chaired by Professor Alexandar P. Sostak. Abstract : Following the Hohle-Sostak notion of lattice-valued neighborhood topological structures [Axiomatic foundations of fixed basis fuzzy topology, in: *Mathematics of Fuzzy Sets: Topology, Logic and Measure Theory*, Edited by U. Hohle and S. E. Rodabaugh, Kluwer Academic Publisher, Dordrecht, 1999], we introduced as a general frame work a notion of fixed basis frame valued neighborhood topological groups [Jawaher Al-Mufarrij and T. M. G. Ahsanullah, On the category of fixed basis frame valued topological groups, *International J. Fuzzy Sets and Systems* 159(2008), 2529-2551]; and following the remarkable filter-based unification [J. Gutierrez Garcia, M. A. de Prada Vicente and A. P. Sostak, A unified approach to the concept of fuzzy $\mathbb{L}\$$ -uniform space, in S.E. Rodabaugh and E. P. Klement, edited, *Topological and Algebraic Structures in Fuzzy Sets*, Kluwer Academic Publishers, Dordrecht, 2003] of known notions of fuzzy uniformity of various kinds, we studied stratified frame valued uniform structures, such as left, right, their infimum and supremum uniformities on fixed basis stratified frame valued neighborhood topological groups. Since the inception of the notion of fuzzy topological groups attributed to D. H. Foster [*J. Math. Anal. Appl.* 67(1979), 549-564], various authors, notably, U. Hohle, A. K. Katsaras, T. M. G. Ahsanullah, Jin-Xuan Fang and Huan Huang introduced and studied this notion from different view point. The purpose of this article is to make an investigation on the relationship of all of these notions of lattice-valued topological groups, and the uniformities they inherit. In doing so, again we take advantage of the excellent paper of Gutierrez Garcia-Vicente-Sostak on unification to look at the relationship between: a) Crisp sets of lattice-valued neighborhood groups and probabilistic lattice-valued neighborhood topological groups, and their uniformities (Hohle's probabilistic uniformity and Gutierrez Garcia et al type uniformity); (b) Lattice-valued topological groups of ordinary subsets and fuzzy neighborhood

groups, and their uniformities (Gutierrez Garcia et al type uniformity and Lowen fuzzy uniformity);
 c) Lattice-valued neighborhood topological groups and their level spaces.

17. Given a talk on fixed basis frame valued convergence group and its uniform convergence structure at Maltepe University, Istanbul, Turkey, 9th July, 2009.
18. Delivered a talk on Change of basis structure of convergence groups, First Annual Math Day Conference at King Saud University, December 16-17, 2009.
19. Chaired a session at the First Annual Math Day Conference, KSU, December 16-17, 2009.
20. Chaired a scientific session of the International Conference on Topology and its Applications, Ankara, Turkey on July 6-11, 2009.
21. Given a talk on Lattice-valued semitopological convergence groups at the 45th Annual Spring Topology and Dynamics Conference held at the University of Texas, Tyler, USA, and March 17-19, 2011.

Abstract of the talk: In this talk we focus the following:

(a) to introduce the notion of lattice-valued semitopological group, generalizing classical notion of semitopological group [W. Ruppert, Compact semitopological semigroups: An Intrinsic Theory, Lecture Notes in Mathematics, Springer-Verlag, Berlin, 1984; A. Arhangel'skii and M. Tkachenko, Topological Groups and Related Structures, Atlantis Press/World Scientific, Amsterdam, 2008], and lay down some of their basic features;

(b) to introduce the notion of lattice-valued semitopological convergence group and discuss the interrelationship with some of the existing notions of lattice-valued convergence groups [T. M. G. Ahsanullah and Jawaher Al-Mufarrij, Frame valued stratified generalized convergence groups, Quaestiones Mathematicae 31(2008), 279-303; T. M. G. Ahsanullah, Lattice-valued convergence ring and its uniform convergence structure, Quaestiones Mathematicae 33(2010), 25-51; Jawaher Al-Mufarrij and T. M. G. Ahsanullah, On the category of fixed basis frame valued topological groups, International Journal of Fuzzy Sets and Systems 159(2008), 2529-2551].

In doing so, we provide some examples based on lattice-valued convergence structure of continuous convergence due to G. Jäger [A category of \mathbb{L} -fuzzy convergence spaces, Quaestiones Mathematicae 24(2001), 501-517];

(c) considering the notion of probabilistic convergence structure attributed to G. Richardson and D. C. Kent [Probabilistic convergence spaces, J. Australian Math. Soc. Series A 61(1996), 1-21], we present the notion of probabilistic convergence group and examine its relationship with some known lattice-valued convergence groups.

Keywords: Lattice-valued topology, lattice-valued semitopological groups; lattice-valued topological groups; lattice-valued semitopological convergence groups; probabilistic convergence groups; lattice-valued Choquet convergence groups; lattice-valued convergence structure of continuous convergence.

AMS Subject Classification (2010): 54A20, 54A40, 54H11.

22. Visited Sichuan University, Chengdu, China from 3rd September to 8th September, 2011.

Host: Professor Dr. Dexue Zhang, Department of Mathematics, Sichuan University, Chengdu, PRC.

Given a talk on the subcategories of stratified frame-valued ordered convergence groups at the Sichuan University, Chengdu, and People's Republic of China on 6th of September, 2011.

23. Visited Auckland University, New Zealand from 3rd November, 2011 to 9th November, 2011.

Host: Professor Dr. David Gauld, Department of Mathematics, Auckland University, New Zealand.

Given a seminar on Enriched lattice-valued topological groups and convergence groups at the Department of Mathematics, Auckland University, New Zealand on 7th November, 2011.

24. Visited the Department of Mathematics and Statistics, Concordia University, Montreal, Canada from 23rd March to 28th March, 2012.

Host: Professor Dr. S. T. Ali, Department of Mathematics and Statistics, Concordia University, Montreal, Canada.

Given a seminar on a topic entitled: On the subcategories of enriched cl-premonoid valued generalized convergence groups and change of basis lattice.

25. Attended Joint Mathematics Meeting (American Mathematical Society) on Categorical Topology on 19th January, 2014 held at Baltimore, Maryland, USA.

26. Attended and given a talk on probabilistic convergence groups under triangular norms and uniformization at the International Conference on Topology and its Applications, 2014 at Nefpaktos, Greece.

Publishedarticles (2014-2016):

1. Enriched lattice-valued convergence groups (jointly with David Gauld, Auckland University, New Zealand, Jawaher Al Mufarrij and Fawzi Al Thukair, KSU), Fuzzy Sets and Systems 238(1)(2014), 71-88.

<http://www.sciencedirect.com/science/journal/01650114/238>

1. Enriched lattice-valued topological groups (jointly with David Gauld, Auckland University, New Zealand, Jawaher Al Mufarrij and Fawzi Al Thukair, KSU), New Math. & Natural Computation 10(1)(2014), 27-53, World Scientific Publishing.

<http://www.worldscientific.com/toc/nmnc/10/01>

2. Probabilistic limit groups under t-norm (jointly with Gunther Jaeger, University of Applied Sciences, Stralsund, Germany), Topology Proceedings, published by Auburn University, Auburn, Alabama, USA and Nipissing University, North Bay, Ontario, Canada. Publication Data: Top. Proc. 44(2014), 59-74.

(E-published on June 3, 2013)

<http://topology.auburn.edu/tp/reprints/v44/>

3. On approach limit groups and their uniformization (jointly with Professor Dr. Gunther Jaeger, University of Applied Sciences Stralsund, Germany), Int. Journal of Contemp. Math. Sciences 9(5)(2014), 195-213.
<http://www.m-hikari.com/ijcms/ijcms-2014/5-8-2014/ahsanullahIJCMS5-8-2014.pdf>
4. Probabilistic uniform convergence spaces redefined, Acta Math. Hungari,(jointly with Professor Gunther Jaeger from Germany), vol. 146(2)(2015)376-390.
<http://www.springer.com./mathematics/journal/10474>
5. Probabilistic uniformization and probabilistic metrization of probabilistic convergence groups, submitted to Slovak Mathematica (jointly with Professor Gunther Jaeger from Germany), Accepted.
6. Links between probabilistic convergence groups under triangular norms and enriched lattice-valued convergence groups, New Math. And Natural Computation, World Scientific Publication, accepted and in press (jointly with Dr. Fawzi Al-Thukair) (To appear in July, 2016).
8. Lattice-valued quasi-bi-uniformizability of lattice-valued quasi-bi-topological neighborhood groups, Int. J. of Contemporary Math. Sci. 10(6)(2015), 253-268(jointly with Dr. Fawzi Al-Thukair and Dr. Jawaher Al-Mufarrij)

Research Collaborations/Co-authors

1. Professor Dr. David Gauld, New Zealand
2. Professor Dr. Gunther Jaeger, Germany
3. Professor Dr.Nehad N. Morsi, Egypt
4. Dr. Mohammad Abul Bashar, Canada
5. Dr. Fawzi Al-Thukair, Saudi Arabia
6. Dr. Jawaher Al-Mufarrij, Saudi Arabia (Former Ph D student)
7. Professor Dr. Abu Osman Md. Tap, Malaysia
8. Professor Dr. Khodadad Khan, Bangladesh
9. Professor ShaplaShrin, Bangladesh
10. Professor Dr. M. K. Chakraborty, India
11. Professor Dr. S. Ganguly, India
12. Dr. MaroufSamhan, Saudi Arabia
13. Dr. Asif Qureshi, Saudi Arabia
14. Dr. Jomana H. Al-Safar, Saudi Arabia (Former Ph D student)

Activities [2015-2016] (Conferences)

Attended 49th Spring Topology and Dynamics Conference held at Bowling Green State University, Ohio, USA from 14-16 May, 2015 and presented a paper entitled: **On the Category of approach convergence rings**

Abstract: Starting with the convergence approach structure attributed to Lowen et al (cf. [5]), we introduce a category of approach convergence rings **ApConvRing**, and look at some of its related categories, We also introduce the notions of approach uniform group and approach uniform convergence group along with some of their basic facts; and show that every approach convergence ring carries in a natural way an approach uniform convergence structure. Here too, we look at some category related properties of the structures involved. We explore the links between the categories of approach Cauchy rings, **ApChyRing** and approach convergence rings **ApConvRing**, and beyond.

References

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- **Attended and presented** an article at the **Italian-Spanish Topology Conference**, ItEs2015 held at the Public University of Navarra, Pamplona, **Spain** from July 15-July 18, 2015. The title of the talk: **Probabilistic topological convergence groups**

Recent Developments:2016

- **Attended and presented** a paper at the **50th Spring Topology and Dynamical System Conference held on March 10-13, 2016 at the Baylor University, Waco, Texas, USA.**
The content of the abstract entitled: **Probabilistic convergence transformation groups** is as follows:

Abstract: Starting with probabilistic convergence structure for probabilistic metric spaces^{1,2} proposed by G. Jäger, and probabilistic convergence groups recently studied by T. M. G. Ahsanullah and G. Jäger³⁻⁶, we introduce and study a notion of probabilistic convergence transformation group over a probabilistic convergence space, generalizing some results of *classical* convergence transformation groups over convergence spaces. The *probabilistic convergence structure* that we used herein this text is linked with R. M. Tardiff's⁷ neighborhood system studied for probabilistic metric spaces.

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• Currently working on the following papers:

1. Lattice-valued convergence semigroups (jointly with Dr. Fawzi Al-Thukair)
2. s -stratified LMN -convergence tower groups and their s -stratified LMN -uniform convergence tower structures (jointly with professor Dr. Gunther Jaeger, School of Mechanical Engineering, University of Applied Sciences Stralsund, Germany)
3. Probabilistic convergence transformation groups
4. On the category of approach convergence rings

• Abstract Accepted for presentation at the upcoming 31st Summer Conference on Topology and its Application to be held at the University of Leicester, United Kingdom from August 2-5, 2016.

Abstract: The idea of stratification mapping between frames $L(=\left(L, \leq, \wedge\right))$ and $M(=\left(M, \leq, \wedge\right))$ introduced and intensively studied by Jäger in [1] for LMN -convergence tower spaces. With this stratification mapping, we introduce a notion of s -stratified LMN -convergence group, $N(=\left(N, \leq, \ast\right))$ being a quantale [2]. While achieving various results, we provide with a variety of motivating examples, some of which are attached to Lowen-Lowen approach convergence spaces [3], Herrlich-Zhang probabilistic convergence spaces [4], Preuss's convergence spaces [5], and probabilistic convergence spaces under so-called triangle function τ on the set of all distance distribution functions Δ^+ studied in [6].

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- [2] P. T. Johnstone, Stone Spaces, Cambridge University Press, 1982.
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- **Given a talk at the Department Seminar on “Regarding probabilistic metrizability of probabilistic convergence groups, an application and some open problems” on 18th May, 2016**
- **Abstract Accepted for presentation at the upcoming Algebra, Topology and Analysis Conference to be held in Serbia July 5-9, 2016.**
- **Abstract:** Considering a complete Heyting algebra \mathbf{H} , we introduce a notion of stratified \mathbf{H} -generalized convergence semigroup, generalizing a notion on stratified enriched lattice-valued convergence groups [1]. We develop basic theory on the subject, besides obtaining conditions under which a stratified \mathbf{H} -generalized convergence semigroup is a stratified \mathbf{H} -generalized convergence group.
We supply a good number of natural examples which include among others, ultra approach convergence semigroups [3], Herrlich-Zhang probabilistic convergence semigroups [4], and stratified \mathbf{H} -generalized convergence semigroups arising from \mathbf{H} -convergence structures, such as structures of pointwise convergence, and continuous convergence on function spaces [5,6].

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- [5] G. Jaeger, Compactness in lattice-valued function spaces, Fuzzy Sets and Systems **161**(2010), 2962--2974.
- [6] G. Jaeger, Connectedness and local connectedness for lattice-valued convergence spaces, Fuzzy Sets and Systems (2016), <http://dx.doi.org/10.1016/j.fss.2015.11.013>.

- **Attended** Algebra, Topology and Analysis Conference held in Cacak, Serbia July 5-9, 2016 and **given a talk** on a paper entitled: Complete Heyting Algebra-Valued convergence semi groups

Latest Research Update: Working on a project relating to **Quantale-valued approach structures** and on the **Categories of probabilistic convergence transformation groups** in collaboration with Professor Dr. Gunther Jaeger from University of Applied Sciences Stralsund, Germany

Submitted articles:

1. T. M. G. Ahsanullah and Fawzi Al-Thukair, Lattice-valued convergence semigroups, preprint, 2016.
2. T. M. G. Ahsanullah and Gunther Jaeger, Probabilistic convergence transformation groups, preprint, 2017.

Paper accepted to give a talk at the upcoming conference at Dayton University, Ohio, USA from June 24-30, 2017

Abstract:

Quantale-valued gauge groups and approach convergence transformation groups

E. Colebunders, et al., introduced a category \mathbf{C} [3], consisting of objects all triple (X, S, δ) , where $X \in |\mathbf{CAP}|$, an object in the category of Lowen-approach spaces [8], $S \in |\mathbf{CAG}|$, an object in the category of approach groups [9], and $\delta: X \times S \rightarrow X$, a contraction mapping. Actually, in [3], the authors brought to light a concept of approach convergence *transformation* monoids without explicit mention. On the other hand, following the idea of probabilistic convergence group [1] (see also [5]), we introduced a category of probabilistic convergence transformation groups, $\mathbf{PCONVTG}$ [2]. Our motive here is to demonstrate the link between these two categories. In so doing and, failing to provide a direct link between these two, apparently different approaches, we consider a *value quantale* V in the line of [6, 7] (see also [4], with opposite order), and propose a notion of quantale-valued gauge group (en route to a category $\mathbf{V-CONVTG}$) - a notion closely related to quantale-valued metric group vis-à-vis quantale-valued convergence group. The advantage that we have using $\mathbf{V-CONVTG}$ is, it provides a global framework, where \mathbf{C} , like many others existing categories of similar nature, serve examples whenever appropriate quantales are considered.

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Invited speaker at the upcoming 3rd International conference on Fuzzy Systems and Data Mining to be held at the National Dong Hwa University, Taiwan, November 24—27, 2017

Speech Title: Lattice-valued Convergence Groups and Various Lattice-valued Transformation Groups

Abstract: Since the inception of Zadeh's seminal paper on fuzzy sets, enormous work has been undertaken over more than 50 years both from theoretical and application point of view. Fuzzy convergence spaces or in terms of present day terminology Lattice-valued convergence spaces/Many-valued convergence spaces, a supercategory of the category of topological spaces, where a good amount of research being done over the years by many authors. Following a notion of L-fuzzy convergence spaces, L being a complete Heyting algebra, attributed to G. Jaeger, we reached to a category of enriched lattice-valued convergence groups and most recently, arrived a step forward to an article entitled Stratified LMN-convergence tower groups and their stratified LMN-uniform convergence tower structures, where L, M are frames and N is a quantale. In this present talk, first, we give an overview of the recent development of lattice-valued convergence theories in conjunction with algebraic structures, and secondly, we focus on L-continuity groups, where the idea of continuity is due to R. Flagg's quantales and continuity, and their various connections to L-convergence groups, L being a value quantale. Finally, we explore the possible link of some of the preceding items, such as, quantale-valued convergence structures as well as quantale-valued metric spaces in conjunction with algebraic structures to theoretical computer science en route to domain theory.

This page is under construction, last modification is made on March 7, 2017