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DEPARTMENT OF MATHEMATICS
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Education

1.The Pennsylvania State University, PA 16802, U.S.A

Doctor's Degree in Mathematics
Thesis: The Gassner Representation of the Braid Group
Thesis Adviser: Professor Edward Formanek
Ph.D degree in December 1995

2.The American University of Beirut, Lebanon

Master Degree in Mathematics- May 1992
Thesis: On a Characterization of Binomial Series
Thesis Adviser: Professor Faruk Abi- Khuzam

3.The American University of Beirut, Lebanon

Bachelor Degree in Mathematics- May 1990

Teaching Experience

1. The Pennsylvania State University, PA 16802, U.S.A

- a. Complex Analysis and Linear Algebra
Fall 1994 (University Park Campus)
Position: Teaching Assistant
- b. Calculus and its Applications
Spring and Summer 1995 (University Park Campus)
Position: Teaching Assistant
- c. Algebra, Trigonometry and Calculus
Fall and Spring 95-96 (Altoona Campus)
Position: Instructor
- d. Calculus with Analytic Geometry
Fall and Spring 96-97 , Fall and Spring 97-98 (University Park Campus)
Position: Assistant Professor

2. The Lebanese American University

Part –Time (1998- 2008)

Position: Assistant Professor

3. Faculty member of Beirut Arab University

(1998 till now)

Assistant Professor: 1998-2005

Associate Professor 2005-2011

Professor since 2011

Current Position (since 2009- till now): Chairperson of the Department of Mathematics & Computer Science

Undergraduate Courses Taught :

Calculus & Analytical Geometry

Multivariable Calculus

Real Analysis

Discrete Mathematics

Special Functions

Measure Theory

Functional Analysis

Theory of Partitions

Complex Analysis

Number Theory

Numerical Methods

Linear Algebra

Topology

Abstract Algebra

Introduction to Statistics

Graduate Courses Taught

Representation Theory

Universal Algebra

Algebraic Topology

Modules and Rings

Galois Theory

Advanced Number Theory

Advisor of Master Theses

On the Composition of Wada's Representations and the Natural Map $B_n \rightarrow B_{nk}$, 2006

Unitary Linear Representations of Braid Group, 2007

Tensoring Linear Representations of the Braid Group B_3 , 2008

The Hecke Algebra Representation of the Pure Braid Groups $P_2, P_3, \dots$, 2008

Krammer's Representations of the Braid Group B_n and its Normal Subgroup, P_n , 2009

Another Proof that Krammer's Representation of B_3 is Faithful, 2010

On the Irreducibility of linear representations of the braid groups B_3 and B_4 2016

Wada representations of the pure braid group P_n , 2022

Using Quantum Computations in constructing irreducible linear representations of the pure braid group P_6 - 2023

On the linear representations of the Universal Braid Group UB_n , in progress

On the composition of the Cohen map and the Tong-Yang-Ma representation, in progress

A criterion for the irreducibility of tensor products of the Gassner representation of the Pure braid group on three strings, in progress

On the Irreducibility of the Tensor Product of Tuba representations of the Braid group on Three strings, in progress

Advisor of Ph.D. Theses:

Pure Braid Group Representations of Low Degree, 2012

Tensor Product of Gassner Representations, 2012

Tensor Product of Burau Representations, 2012

On the faithfulness of linear representations of braid groups 2016

Various dimensional irreducible representations of the Pure Braid Group, 2019

On the Unitary Representations of the Braid Group B_6 , 2019

On representations of the braid group and its extensions, 2022

Irreducible Representations of the Braid Group and its normal subgroups in various dimensions- 2024

Braids and their Automorphism groups- 2024

Bureau representations with relative strands' weights and their Extensions to Loop Braid groups, in progress

S

On the Generalizations of Artin Braid group and Temperley-Lieb Algebra, in progress

Membership

- **A reviewer of American Mathematical Society
(Member since 2015)**
- **A reviewer of Journal of Mathematics & Statistics
(Member since 23/12/2021)**

Publications

1. M.N. Abdulrahim, A Faithfulness Criterion of the Gassner representation of the Pure Braid Group, Proceedings of the American Mathematical Society, V. 125, no. 5, May 1997, 1249-1257.
2. M.N. Abdulrahim, Complex Specializations of the Reduced Gassner Representation of the Pure Braid Group, Proceedings of the American Mathematical Society, V. 125, no. 6, June 1997, 1617-1624.
3. M.N. Abdulrahim, The reduced Gassner Representation restricted to a normal free subgroup of the Pure Braid Group. Archive Der Mathematik, V. 69, 1997, 8-12.
4. M.N. Abdulrahim, On the Composition of the Bureau Representation and the Natural Map $B_n \rightarrow B_{nk}$. Journal of Algebra and its Applications, V. 2, no. 2, June 2003, 169-175.
5. M.N. Abdulrahim & Woo Lee, The Hecke algebra representations of the braid groups B_2 and B_3 . Int. J. Appl. Math, V. 14, no. 4, 2003, 325-331.

6. M.N. Abdulrahim, A braid element with eigenvalues as distinct powers of a complex number. *Int. J. Appl. Math*, V. 15, no. 1, 2004, 17-28.
7. M.N. Abdulrahim, The Number of Descending paths from a given Young Diagram to a smaller one. *Mathematical Sciences Research Journal*, V.8, no. 10, 2004, 312-317
8. M.N. Abdulrahim, On Embeddings of Pure Braid Groups P_n to P_{n+k} , *Int. J. Appl. Math*, V. 16, no. 1, 2004, 1-12
9. M.N. Abdulrahim, Pure Braids as Automorphisms of free Groups. *Journal of Algebra and its Applications*, V. 4, no. 4, 2005, 435-440.
10. M.N. Abdulrahim & E. Formanek, Tensor Products of Specializations of the Burau Representation, *Journal of Pure and applied Algebra*, V. 203, no. 1-3, 2005, 104-112.
11. M.N. Abdulrahim, Wada's Representation and the natural map B_n to B_{2n} , *Int. J. Pure and Appl. Math*, V.18, no.2, 2005, 137-142.
12. M.N. Abdulrahim, Generalizations of the standard Artin representation are unitary, *Int. J. Math. Math. Sci.*, no. 8, 2005, 1321-1326.
13. M.N. Abdulrahim, Wada's Representations of the Pure Braid Group, *International Journal of Mathematics*, V.16, no. 7, 2005, 757-763.
14. M.N. Abdulrahim, Wada's representation is of Burau type. *International Journal of Algebra & Computation*, V. **17**, no.3, 2007, 557-565.
15. M.N. Abdulrahim & N. Kassem, The interplay between linear representations of the braid group. *Int. J. Math. Math. Sci.* **2007**, Art. ID 16186, 9 pp.
16. M.N. Abdulrahim, The Kernel of Wada's Representation restricted to a normal free subgroup of the Pure braid group, *International journal of Applied Mathematics*, V. 21, no. 2, 2008, 239-245.
17. M.N. Abdulrahim & D. Santana, The Hecke Algebra Representation of the braid group B_3 is conjugate to a unitary representation, *International journal of Applied Mathematics*, V. 21, no. 3, 2008, 369-374

18. M.N. Abdulrahim, On the Composition of Wada's representation and the natural map $\rho: P_n \rightarrow P_{n+k}$, Advances in Algebra, V. 1, no. 1, 2008, 47-55.
- 19 . M.N. Abdulrahim & M.Al-Tahan, Complex Specializations of Krammer's Representation of the Braid Group, B_3 , J. Math. Stat. , V.4, no. 4, 2008, 213-216.
- 20 . M. N. Abdulrahim, Tensor Products of the Gassner representation of the pure braid group, Open Math J., V. 2, 2009, 12-15
21. M.N. Abdulrahim, Tensoring Three irreducible linear representations of the Braid Group, Linear and Multi Linear Algebra ,V.57, no. 8, 2009, 749-758.
22. M. N. Abdulrahim, Gassner Representation of the Pure Braid Group, P_4 , Int. J. Algebra, V. 3, no. 16, 2009, 793-798.
23. M.N. Abdulrahim, On the irreducibility of linear representations of the pure braid group, Tamkang Journal of Mathematics, V. 41, no.3, 2010, 283-292.
24. M.N. Abdulrahim & M.Al-Tahan, On a class of irreducible representations of the braid group, B_n , International journal of Applied Mathematics, V. 23, no. 4, 2010, 681-691.
25. M.N. Abdulrahim & M.Al-Tahan, Krammer's Representation of the Pure Braid Group, P_3 , Int. J. Math. Math. Sci. **2010**, Art. ID 806502, 10 pp.
26. M.N. Abdulrahim & G. H. Abboud, Pure Braid group representations of low degree, Int. J. Algebra, V. 5, no. 21-24, 2011, 1011-1020.
27. W.M. Zeid & M.N. Abdulrahim, Irreducibility of the Tensor product of specializations of the Burau representation of the braid groups, ISRN Algebra, V. 2011, Article ID 104263, 9 pages.

28. H.A.Tarraf & M.N. Abdulrahim, Higher Dimensional Irreducible Representations of the Pure Braid group, Journal of Mathematics Research, V.3, no.4, 2011, 141-151
29. M.N. Abdulrahim & Hariri, Mariam, Another proof of the faithfulness of the Lawrence-Krammer representation of the braid group B_n . ISRN Algebra 2012, Art. ID 858959, 13 pp .
30. M.Chreif & M.N. Abdulrahim, Irreducible representations of the pure braid group P_n , International journal of Applied Mathematics, V. 25, no. 5, 2012, 723-728
- 31 G. H. Abboud & M. N.Abdulrahim, On the irreducibility of Wada's representation of the pure braid group P_4 , , Open Math J., V. 5, 2012, 15-18
32. W.M. Zeid & M.N. Abdulrahim, Tensor product of Wada's representations of the braid group, B_3 , Int. Math. Forum, V. 7, no. 29-32, 2012, 1413-1418
33. H.A.Tarraf & M.N. Abdulrahim, Tensor Product of Krammer's representations of the Pure braid group, P_3 , Advances in Pure Math, 2012,2, 190- 194
34. M.N. Abdulrahim & I.Daakur, Wada's representations of the pure braid group of high degree, Theoretical Mathematics & Applications, V.2, no. 1, 2012, 117-125.
35. M.Al-Tahan, M.N.Abdulrahim & S.S. Habre, Multi-parameter Burau representations, Tamkang Journal of Mathematics, V. 44, no.1, 2013, 91-98.
36. M.Al-Tahan, M.N. Abdulrahim, A new six Dimensional representation of the braid group on three strands and its irreducibility and unitarizability, British Journal of Mathematics & Computer Science, V.3, no.3, 2013, 275-280
37. M.Al-Tahan, M.N. Abdulrahim, An Overview of Wada's representations, Journal of Mathematical & Computational Science, V.3,no.6, 2013, 1430-1443
38. . M.Al-Tahan, M.N. Abdulrahim & S.S. Habre, Spin Representations with negative indices, Tamkang Journal of Mathematics, V.45, no. 4, 2014, 367-374.
39. N.Maanna, M.N. Abdulrahim, Tuba's Representation of the pure braid group on three strands, British Journal of Mathematics & Computer Science V.4, no. 16, 2014, 2381-2402.
- 40.M.Dally, M.N. Abdulrahim, On the irreducibility of Artin's group of graphs, Journal of Mathematics Research, V.7, no.2, 2015, 117-124.

- 41 M.Chreif & M.N. Abdulrahim, Attacks on the Faithfulness of the Burau Representation of the Braid Group B_4 Journal of Mathematics Research, V.8, no.1, 2016, 5-9.
- 42 M. . Chreif & M. N. Abdulrahim, On the Irreducibility of the complex specialization of the representation of the Hecke algebra of the complex reflection group G_7 , Journal of Linear & Topological Algebra, V.5, No.4, 2016, 263-270
- 43 M. Chreif & M. N. Abdulrahim , The Hecke Algebra representation of the complex reflection group G_7 is unitary, JP Journal of Algebra, Number Theory and Applications, V.39, No.2, 2017, 151-164
- 44 M.M..Dally, M.N. Abdulrahim, On the irreducibility of Perron representations of degrees 4 and 5, Eur.J.Pure Appl.Math, V.11, No. 1, 2018, 215-237.
- 45 H.A..Haidar, M.N.Abdulrahim, On the irreducibility of fourth dimensional Tuba's representation of the pure braid group on three strands, Eur.J.Pure Appl.Math, V.11, No. 3, 2018, 682-701
46. A.Taha, M.N. Abdulrahimm Irreducibility of the tensor product of Albeverio's representations pf the Braid groups B_3 and B_4 , Journal of Linear and Topological Algebra, V.8, No. 2, 2019, 105-115.
47. H.A..Haidar, M.N.Abdulrahim, On the Irreducibility of the pure braid group on three strands, International Journal of Applied Mathematics, V.32, No.2, 2019, 249-257.
- 48 M.M..Dally,, M.N.Abdulrahim ON THE FAITHFULNESS OF JONES-WENZL REPRESENTATION OF THE BRAID GROUP B_4 , International Journal of Applied Mathematics, V.32, No.3, 2019, 423-431.
49. Malak Dally, M.N,. Abdulrahim, On the Unitary Representations of the Braid Group B_6 . MDPI Mathematics, V.7, No.11, 2019.
50. Hassan Haidar, M.N,. Abdulrahim, On the Faithfulness of the Representations of the Extraspecial 2-Groups E_m^{-1} . International Journal of Mathematics and Computer Science, V, 15, No.3, 2020 , 787-798.

51. Hassan Haidar, M.N., Abdulrahim, Irreducibility of a specialization of the three dimensional Albeverio–Rabarovich representation of the pure braid group P_3 . *Rend. Mat. Appl.*(7) V. 41 ,2020, 155-162
52. M. Nasser, M.N., Abdulrahim. ON THE COMPOSITION OF THE PERRON-VANNIER REPRESENTATION AND THE NATURAL MAP $P_n \rightarrow P_{2n}$ *International Journal of Applied Mathematics*, V33 (1),2020, 125-136.
53. T. Mayassi, M.N. Abdulrahim, REPRESENTATIONS OF THE NECKLACE BRAID GROUP NB_n OF DIMENSION 4 ($n=2,3,4$), *Arabian Journal of Mathematics*, V. 10, 2021, 423-441.
54. M. Nasser, M.N., Abdulrahim, ON THE IRREDUCIBILITY OF THE EXTENSIONS OF BURAU AND GASSNER REPRESENTATIONS; *Annali Dell ‘Universita’ Ferrara*, V.67, 2021, 415-434.
55. R. Kahil, M.N., Abdulrahim, ON THE REPRESENTATIONS OF THE BRAID GROUP CONSTRUCTED BY C.M. EGEE AND E. GALINA, *Arabian Journal of Mathematics*, V.11, No. 2, 2022, 303-311.
56. M. Nasser, M.N., Abdulrahim, The irreducibility of the complex specialization of Lawrence-Krammer representation of P_4 on band generators. *Indian J. Math.* **65** , No. 1, 2023, 117--133.
57. T. Mayassi, M.N, Abdulrahim B_3 BLOCK REPRESENTATIONS OF DIMENSION 6 AND BRAID REVERSIONS, *Note Mat.* V.42 No.2 , 2022, 53—62
58. M. Nasser, M.N, Abdulrahim . On the faithfulness of the extension of Lawrence-Krammer representation of the group of conjugating automorphisms C_3 . *J. Indian Math. Soc. (N.S.)* **90**, No. 3-4, 2023 , 309--318.
59. R. Kahil, M.N, Abdulrahim ON THE REPRESENTATIONS OF THE BRAID GROUP AND THE WELDED BRAID GROUP, *Journal of Prime Research in Mathematics*, V.19 No.1, 2023 34-43

60. T. Mayassi, M.N, Abdulrahim IRREDUCIBLE REPRESENTATIONS OF THE BRAID GROUP B_3 IN DIMENSION 6, The Journal of the Indian Mathematical Society, 2024 (**Accepted**)
61. T. Alaa Eddine, M.N, Abdulrahim , On the Irreducibility of Wada's Representation of the Pure Braid Group on n strings, *Indian J. Math.* V.66 , No 2, 2024, 1-30.
62. R. Kahil, M.N, Abdulrahim ON THE LIFTING AND EXTENSION PROBLEMS OF THE AUTOMORPHISMS OF THE PURE BRAID GROUP, *Rend. Circ. Mat. Palermo (2)* V. **74**, no. 3, Paper No. 92, 9 pp., 2025
63. T. Alaa Eddine, M.N, Abdulrahim , M.N. Extension of Wada's Representation of the Pure Braid Group on n Strings. *Vietnam J. Math.*, 2026.
<https://doi.org/10.1007/s10013-026-00805-x>
64. Amal Moulla, M.N. Abdulrahim, On the Composition of Cohen map and the Tong-Yang-Ma representation, *Arabian Journal of Mathematics*, 2026.
(Accepted)

Conferences and Activities

1. A seminar about: Algebraic K- Theory,
The Pennsylvania State University, U.S.A, 1994.
2. A seminar about: Coding Theory,
The Pennsylvania State University, U.S.A, 1994
3. A seminar about: Braid Group
The Pennsylvania State University, U.S.A, 1994
4. The Hecke Algebra Representation of the Braid Group, Proceedings of the International Conference on research trends in Science and Technology, RTST 2002, Lebanese American University.
5. The Branching Theorem and its Applications, Proceedings of the International Conference on research trends in Science and Technology, RTST 2005, Lebanese American University.
6. Tensor Product of Specializations of the Burau Representation,
Colloquium Lecture at The American University of Beirut, Lebanon, 2009

(joint work with Edward Formanek published in Journal of Pure and applied Algebra)

7. Complex Specializations of Krammer's Representation of the Braid Group B_3 , Mathematics Workshop, Beirut Arab University, 2009 (joint work with Madline Al-Tahan and published in J. Math. Stat)
8. The composition of Krammer's representation and the natural map $B_3 \rightarrow B_6$, the 16th International Conference of the Lebanese Association for the Advancement of Science, Lebanon, 2009 (joint work with Wafaa Hammoud)
9. Conference on Algebra, Lie Groups and Related Topics, April 23rd, 2014, American University of Beirut.

References

1. Edward Formanek (Ph.D. Thesis Advisor, The Pennsylvania State University, USA, 1995) – retired-
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USA

2. Faruk Abi Khuzam (MS Thesis Advisor, American University of Beirut, Lebanon, 1992)
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