

CURRICULUM VITAE OF

Dr. Hocine Guediri

January 2024

I) Personal Data

Last name: GUEDIRI

First name: HOCINE

Date and place of birth: 1970 — Algeria

Nationality: Algerian

Marital status: Married

Current address:

Department of Mathematics, College of Science, King Saud University

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II) Education:

Languages: Arabic, English and French.

Ph.D. (Doctorat):

University: Provence University (Aix Marseille I), Marseille, France, May 2001.

Title: Integral equations methods for various problems of mechanics: elasto-acoustic coupling and friction problems.

Field: Applied Mathematics (Boundary value problems)

Adviser: Professor Marc Durand.

M.Sc. (Master degree / Magistère):

University: Annaba University, Algeria, June 1996.

Title: Direct boundary integral equations method for a mixed polyharmonic problem.

Field: Mathematical analysis of boundary value problems

DEA (First year graduate degree):

Mathematical analysis of boundary value problems, Annaba University, Algeria, June 1994.

B.Sc. (DES):

Mathematics (Functional Analysis), Constantine University, Algeria, June 1993.

III) Professional Activities:

March 31, 2013- -> : Associate Professor, King Saud University, Riyadh (Saudi Arabia).

2001- -03/2013 : Assistant Professor, King Saud University, Riyadh (Saudi Arabia).

2000- -2001 : Assistantship Position (ATER), Provence University, Marseille (France).

1999- -2000 : Research Fellowship, Stuttgart University, Stuttgart (Germany).

1994- -1998 : Assistantship Position, Annaba University, Annaba (Algeria).

IV) Teaching Experience:

Graduate courses:

- Real Analysis, (Measure and Integration).
- Complex Analysis I and II.
- Functional Analysis I and II.
- Potential Theory in the Complex Plane.
- Operator Theory and Banach Algebras.
- Advanced Topics in Operator Theory on Function Spaces.
- Harmonic Analysis.
- Geometric Function Theory.
- Integral Equations.

Undergraduate courses:

- Complex Analysis.
 - Real Analysis, (Measure Theory and integration).
 - Topology
 - Calculus I, II and III
 - Multivariable Calculus.
 - Vector Calculus.
 - Differential and Partial differential equations.
 - Linear Algebra.
 - Discrete Mathematics.
 - Algebra.
 - Probability and Statistics.
 - Stochastic Processes.
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V) Supervision of Ph.D. and M.Sc. Thesis:

1. Ph.D.:

- (a) Farouq Sadeq Alshormani: Algebraic Properties of Toeplitz and Hankel Operators on the Bergman Space over the Complex Upper Half-Plane. King Saud University, Riyadh, October 2023.

2. M.Sc.

- (a) Farouq Sadeq Alshormani: Berezin Transform and Toeplitz Operators on the Hilbertian Hardy Space. King Saud University, Riyadh, May 2015.
- (b) Abdulrahman Hamed Balfaqih: The Riemann Zeta Function and the Prime Number Theorem. King Saud University, Riyadh, May 2014.
- (c) Maryam Gharamah Al-Shehri: Fredholm Toeplitz Operators on the Hardy Space over the Circle. King Saud University, Riyadh, May 2012.
- (d) Madawi Mohammed Al-Mooka'a: Quasinormal Toeplitz Operators on the Hilbertian Hardy Space and Halmos' Problem V. King Saud University– and – Hail University, Hail, May 2012.
- (e) Amsha'a Khalaf Al-Hasher: Toeplitz Operators on Generalized Hardy Spaces. King Saud University– and – Hail University, Hail, May 2012.
- (f) Roaa Khalil Abed: Spectral properties of Toeplitz operators on the Bergman space. King Saud University, Riyadh, September 2010.
- (g) Balsam Ali Al-Suhaibani: Compactness criteria for Toeplitz operators on the Bergman space. King Saud University, Riyadh, July 2009.
- (h) Maasouma Abdullah Al-Ali: Algebraic properties of Toeplitz operators on the harmonic Bergman space. King Saud University, Riyadh, December 2008.
- (i) Maha Rahma Al-Ammari: Products of Bergman space Toeplitz operators and Brown-Halmos type theorems. King Saud University, Riyadh, June 2006.
- (j) Shams Yusof Al-Yusof: Dual Toeplitz operators versus Toeplitz operators. King Saud University, Riyadh, February 2006.
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VI) Supervision of B.Sc. Memoirs:

1. Complex Analysis: Complex Analysis: Harmonic functions and the Dirichlet problem in the complex plane, First Semester 2009–2010.
2. Complex Analysis: Seven proofs of the fundamental theorem of algebra, 2nd semester 2008–2009.
3. Complex Analysis: Möbius transformations, First semester 2005–2006.
4. Real Analysis: Three famous theorems in real analysis, First Semester 2004–2005.
5. Complex Analysis: Various forms of the maximum modulus principle and applications, Second Semester 2003–2004.
6. Harmonic Analysis: Positive harmonic functions and Bôcher's theorem, 1st Semester 2003–2004.
7. Ordinary Differential Equations: Scott's theorem and applications to differential equations, Second Semester 2002–2003.
8. Partial Differential Equations: Green's function method for the Dirichlet problem associated to Laplacian, Second Semester 2001–2002.

VII) Current research Interests:

My recent research interests turns round operator theory on function spaces. The concrete classes of operators I am interested in are Toeplitz, Hankel and dual Toeplitz, composition, Volterra and Cesàro integration operators on Hardy, Dirichlet, Fock and Bergman spaces and their orthogonal complements. My interests include their algebraic properties such as intertwining relations, products, commutativity, normality, quasinormality, hyponormality, as well as their boundedness and compactness, and also their spectral properties (spectra, invertibility, numerical ranges, Fredholmness). I am also interested in studying the C^* -algebras generated by Toeplitz operators. The Berezin transform is one of the main tools in the investigation of these operators, thus this operator attracts my attention as well, along with related aspects in quantum physics namely the Berezin and Toeplitz and Weyl quantizations.

Areas of Expertise :

Functional Analysis and Complex Analysis, with applications to Quantum Mechanics.

1. Operator theory.

2. Banach Algebras and C*-algebras.
3. Concrete operators: operator theory on function spaces (Toeplitz, Hankel, Dual Toeplitz, Composition, Volterra).
4. Reproducing Kernel Hilbert spaces.
5. Function spaces: Bergman, Hardy, Dirichlet, Fock, Bloch, Wiener, Besov.
6. Conformal Geometry.
7. Pseudodifferential Operators.
8. Berezin, Toeplitz and Weyl quantizations.
9. Potential Theory in The complex plane (Harmonic, sub-harmonic functions).
10. Integral Equations and applications to acoustics and contact mechanics and variational inequalities.

Refereeing activities:

I am a reviewer for the Mathematical Review (American Mathematical Society), (Reviewer number: 31459). I served as referee for the following journals:

1. Journal of Mathematical Analysis and Applications.
2. Acta mathematica Sinica.
3. Georgian Mathematical Journal.
4. Operators and Matrices.
5. Linear and multilinear algebra.
6. Bulletin of the Korean Mathematical Society.
7. Hacettepe Journal of Mathematics and Statistics.
8. Mathematical Methods in the Applied Science.

9. Arab Journal of Mathematical Science.
10. Arabian Journal for Science and Engineering .
11. Annals of Functional Analysis.
12. Filomat.

VIII) Publications:

- [G24] Guediri, H. (with Garayev, M.T. and Alshormani, F. S.N.): Upper boundes for Berezin numbers of self-adjoint operators and applications. *Baku Mathematical Journal*, To appear 2024.
- [G23] Guediri, H. (with Garayev, M.T. ; Sadraoui, H. and Halouani, B.): A Banach algebra structure on the q -Bergman space and related topics. *Colloq. Math.* 174 (2023), no. 2, 285–300.
- [G22] Guediri, H. (with Garayev, M.T. and Sadraoui, H.): Toeplitz-Berezin-type symbols and solutions of some operator equations. *Illinois J. Math.* 67 (2023), no. 3, 423–442.
- [G21] Guediri, H. (with Alshormani, F. S.N.): Products of Toeplitz operators with angular symbols. *Georgian Math. J.* 30 (2023), no. 1, 19–32.
- [G20] Guediri, H. (with Tran, Phung Dinh; Duc, Dinh Thanh; Tuan, Vu Kim; Garayev, M.). Time-fractional integro-differential equations in power growth function spaces. *Fract. Calc. Appl. Anal.* 26 (2023), no. 2, 751–780.
- [G19] Guediri, H. (with Benaissa, L.): Exact sequences for dual Toeplitz algebras on hypertori. *Arab. J. Math.* (Springer) 12 (2023), no. 1, 71–81.
- [G18] Guediri, H. (with Garayev, M.T. and Altwaijry, N.): Reverse inequalities for the Berezin number of operators. *Proc. Inst. Math. Mech. Natl. Acad. Sci. Azerb.* 48 (2022), no. 2, 179–189.
- [G17] Guediri, H. (with Garayev, M.T. and Sadraoui, H.): On hyponormality of Toeplitz operators. *Rocky Mountain J. Math.* 51 (2021), no. 5, 1821–1831.

- [G16] Guediri, H. (with Garayev, M.T. M. Gürdal and G. M. Alsahli): On some problems for operators on the reproducing kernel Hilbert space. *Linear and Multilinear Algebra* 69 (2021), no. 11, 2059–2077.
- [G15] Guediri, H. (with N. Altwajry, M.T. Garayev and A. Baazeem): Skew-symmetric and essentially unitary operators via the Berezin symbols. *Open Math.* 18 (2020), no. 1, 1760–1770.
- [G14] Guediri, H. (with Garayev, M.T. and Sadraoui, H.): New characterizations of Bloch spaces, Bers-type and Zygmund-type spaces and related Questions. *Ufa Mathematical Journal*, Vol. 10 (3), pp. 131-141, 2018.
- [G13] Guediri, H. (with Garayev, M.T. and Sadraoui, H.): Applications of reproducing kernels and Berezin symbols. *New York J. Math.* 22, 583–604, 2016.
- [G12] Guediri, H. (with Garayev, M.T. and Sadraoui, H.): On Some Problems in the Space $\mathcal{C}^n[0, 1]$ and related questions. *Politehn. Univ. Bucharest Sci. Bull. Ser. A Appl. Math. Phys.* 78, no. 1, 147–156, 2016.
- [G11] Guediri, H. (with Garayev, M.T. and Sadraoui, H.): The Bergman space as a Banach Algebra. *New York Journal of Mathematics*, Vol. 21, pp. 339- - 350, (2015).
- [G10] Guediri, H. (with Benaissa, L.): Properties of Dual Toeplitz Operators with Applications to Haplitz Products on the Hardy space of the Polydisk. *Taiwanese Journal of Mathematics*, Vol. 19 no. 1, p.p. 31- - 49, (2015).
- [G9] Guediri, H. : Products of Toeplitz and Hankel Operators on the Hardy Space of the Unit Sphere. *Oper. Theory Adv. Appl.*, Vol. 236, PP. 243–256 Birkhäuser/Springer, Basel, 2014.
- [G8] Guediri, H. : Dual Toeplitz Operators on the Sphere. *Acta Math. Sin. (Engl. Ser.)* 29 no. 9, 1791–1808, (2013).
- [G7] Guediri, H. : Quasinormality and numerical ranges of certain classes of dual Toeplitz operators. *Abstract and Applied Analysis*, Volume 2010 (2010), Article ID 426319, 14 pages, doi:10.1155/2010/426319.

- [G6] Guediri, H. : *Function theoretic proofs of Brown-Halmos theorems*, Arab J. Math. Sc., 13 (2007) , 15-26.
- [G5] Durand, M. and Guediri, H. : *Scattering of acoustic waves by a layered elastic obstacle: a direct integral equations approach*, Adv. Math. Sci. Appl. 13 (2), (2003), 519-547.
- [G4] Guediri, H. : *On a boundary variational inequality of the second kind modelling friction*, Math. Methods Appl. Scie., 25 (2), (2002), 93-114.
- [G3] Guediri, H. : *Characterization of the coincidence set for mixed Signorini problems*, Applicable analysis, 77 (3-4), (2001), 327-341.
- [G2] Guediri, H. : *A regularization procedure for a boundary variational inequality of the second kind*, Nonlinear Oscillations, 4 (1), (2001), 50-70.
- [G1] Guediri, H. : *A regularization method for a boundary variational inequality of the second kind associated to a friction problem*, C. R. Acad. Sci. Paris, Série IIb Mechanics, 318 (12), (2000), 899-904.

Proceedings contributions:

- [G17] Guediri, H. : Compactness of certain classes of Toeplitz operators on the harmonic Bergman space. Proceedings of the Fourth International Conference on Mathematical Science (ICM2008), United Arab Emirates University, Al-Ain UAE, Vol. 3 PP 911–932, March 03-06, 2008.
- [G18] Guediri, H. : *Qualitative properties and characterization of the solution of a fourth order Signorini contact problem*, Proceedings of the six'th meeting of the SAMS, April 9–10 (2002), PP. 17-26.
- [G19] Durand, M. and Guediri, H. : *A new system of integral equations for the elasto-acoustic coupling problem*, Mathematical and numerical aspects of wave propagation (Santiago de compostela, 2000), SIAM, Philadelphia, PA, (2000), PP. 143-147.

IX) Miscellaneous Professional Activities:

- Administrative Assignment: Vice Chairman of the Department of Mathematics (Sep 2011–Aug 2018).
- Regular associate to the ICTP, Trieste, Italy (2009–2015).
- Reviewer for Math.Reviews of the A.M.S. (reviewer number 31459).
- Member of Saudi Association of Mathematical Sciences (SAMS).
- Referee for several international mathematical journals, projects and technical reports.
- Coordinator of B.Sc. research projects' Committee in the Department.
- Coordinator of the Analysis Committee of the Department.
- Member of the Committee of strategic plans in the college of science.
- Member of the Committee of academic affairs.
- Member of the Committee of Topology and Geometry.
- Member of the Committee of KPI's in the department.
- Member of the Committee of accreditation of graduate programs.
- Preparation of PhD Qualifying Exams for several times.
- Referee for several research centers of: KACST, KSU, KAU-Jeddah, KKhU-Abha, Al-Majma'a and Imam University-Riyadh.
- Supervisor of 12 Msc. thesis, and 3 PhD. thesis.
- Co-supervisor of several Msc. and PhD. thesis.
- A jury member of 17 M.Sc. thesis.
- A jury member of 5 Ph.D. thesis, (internal and external examiner).
- A referee for promotion (to associate professor rank).

X) Participation in Conferences:

1. Summer School on Mathematical Analysis and Differential Geometry, 25/ 6 / 2022, King Saud University, Riyadh, Saudi Arabia.
2. Invited speaker: First International Workshop on Interaction between Operator Theory and Linear Dynamical Systems, El Jadida, Morocco, June, 27th-29th, 2019.
3. 28th International Workshop on Operator Theory and its Applications (IWOTA 2017), Chemnitz Technical University, Chemnitz, Germany, August 14 - - 18, 2017.
4. Fifth International Conference and School Geometry, Dynamics, Integrable Systems-GDIS 2014: Bicentennial of great Poncelet Theorem and Billiard Dynamics. ICTP, Trieste (Italy), June 16 - - 27, 2014.
5. 24th International Workshop on Operator Theory and its Applications (IWOTA 2013), Indian Institute of Science, Bangalore (India), December 16 - - 20, 2013.
6. Advanced School and Workshop on Matrix Geometries and Applications, ICTP, Trieste (Italy), July 1 - - 12, 2013.
7. Second Annual Math Days of King Saud University, Riyadh, March 14 - -16, 2012.
8. 22nd International Workshop on Operator Theory and its Applications (IWOTA 2011), University of Sevilla (Spain), July 3- -9, 2011.
9. Conference: Mathematics and its Applications, Al-Imam University, Riyadh, March 23- - 16, 2011.
10. Advanced school and workshop on discrete groups in complex geometry, ICTP, Trieste (Italy), June 28 - - July 13, 2010.
11. First Annual Math Days of King Saud University, King Saud University, Riyadh (Saudi Arabia), December 16–17, 2009.

12. The XIXth International Workshop on Operator Theory and its Applications (IWOTA2008), The college of William and Mary, Williamsburg, Virginia, USA, July 22 - July 26, 2008.
 13. The Ninth Workshop on Numerical Ranges and Numerical Radii (WONRA), The college of William and Mary, Williamsburg, Virginia, USA, July 19 - July 21, 2008.
 14. Symposium on Global Analysis and Probability, Qassim University, Saudi Arabia, May 27–28, 2008.
 15. The Fourth International Conference on Mathematical Science (ICM2008), United Arab Emirates University, Al-Ain UAE, March 03-06, 2008.
 16. (A joint work with Prof. M.A. Al-Gwaiz) The seven'th meeting of the SAMS on Information Technology in Mathematics, Prince Sultan University, Riyadh (Saudi Arabia), April 7–8, 2004.
 17. The six'th meeting of the SAMS, King Saud University, Riyadh (Saudi Arabia), April 9–10, 2002.
 18. The fifth International conference on wave propagation, Mathematical and numerical aspects of wave propagation (Santiago de compostela, Spain 2000), SIAM-INRIA-Univ. Santiago de compostela (Spain), July 10-14, 2000.
 19. Deuxième colloque national en analyse fonctionnelle et applications, Sidi Bel Abbas (Algeria), November 17-19, 1997.
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XI) Seminars I have given so far:

1. 2nd Intensive Summer Courses on Mathematical Analysis and Differential Geometry, 20–31/ 68/ 2023, King Saud University, Riyadh, Saudi Arabia.
2. Summer School on Mathematical Analysis and Differential Geometry, 19–30/ 6 / 2022, King Saud University, Riyadh, Saudi Arabia.

3. Intensive training period of Olympiad Geometry to the Algerian Olympiad Team, 11-17 July, 2021, Algeria.
4. Department of Mathematics, King Saud university, Riyadh, (Saudi Arabia) 2014.
5. Department of Mathematics, King Fahd University of Petroleum and Minerals (KFUPM), Dahrhan, (Saudi Arabia) 2010.
6. 2nd Summer School, June 2009, El-Oued University, Algeria. 2009.
7. Department of Mathematics, King Fahd university of Petroleum and Minerals, Dahrhan, (Saudi Arabia) 2009.
8. Department of Mathematics, King Saud university, Riyadh, (Saudi Arabia) 2008.
9. Department of Mathematics, King Saud university, Riyadh, (Saudi Arabia) 2002.
10. Department of Mathematics, Brunel University, London, (U.K.) 2001.
11. Laboratoire d'Analyse Appliqué, C.M.I., Marseille, (France) 2000.
12. Mathematisches Institut A, 6 Lehrstuhl, University of Stuttgart, (Germany) 1999.
13. Laboratoire d'Analyse Appliqué, C.M.I., Marseille, (France) October 1998.
14. Laboratoire d'Analyse, University Montpellier II, (France) November 1995.
15. Institut de Mathématique, Annaba University, (Algeria) 1995.
16. Institut de Mathématique, Annaba University, (Algeria) 1994.

XII) Attended Conferences, Workshops and Summer Schools:

1. (SEAM 38) Southeastern Analysis Meeting, University of Florida, USA, 5-6 March 2022 (Online).
2. International Workshop on Operator Theory and its Applications (IWOTA 32) Chapman University–California, USA, Online, August 9-13, 2021,

3. International Workshop on Operator Theory and its Applications (IWOTA Lancaster UK 2021), Online, Monday 16th - Friday 20th August 2021.
4. (SEAM 37) Southeastern Analysis Meeting, University of Florida, USA, March 13 - 14 2021 (Online).
5. Operator Theory with its Applications (OTWIA) (online), University of Florida, USA, From August 10th. to August 13th, 2020.
6. Fifth International Conference and School Geometry, Dynamics, Integrable Systems-GDIS 2014: Bicentennial of great Poncelet Theorem and Billiard Dynamics. ICTP, Trieste (Italy), June 16 - - 27, 2014.
7. Advanced School and Workshop on Matrix Geometries and Applications, ICTP, Trieste (Italy), July 1 - - 12, 2013.
8. Advanced school and workshop on discrete groups in complex geometry, ICTP, Trieste, Italy, June 28- -July 16, 2010.
9. Workshop: Mathematical Modelling of Dynamics, King Abdulaziz City of Science and Technology, Riyadh (Saudi Arabia), May 30, 2007.
10. Workshop: Partial Differential Equations in Modern Mathematical Physics and Applied Mathematics, King Abdulaziz City of Science and Technology, Riyadh (Saudi Arabia), February 13, 2007.
11. Workshop on Wavelets: Theory and Applications, King Abdulaziz City of Science and Technology, Riyadh (Saudi Arabia), December 14, 2004.
12. European Summer School on Fluid Structure Interaction, Prague (Czech Republic), August 19–29, 2001.
13. Doctoral School on Shape Optimization, Provence University (France), March 2000.
14. International Conference on Multifield Problems, University of Stuttgart (Germany), October 6–8, 1999.
15. Doctoral School on Integral and Pseudodifferential Operators and Applications, Stuttgart University (Germany), December 1998.

16. Short training period at Stuttgart university (Germany), December 1998.
 17. Training period at Montpellier II university, Montpellier (France), November 1995.
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XIII) List of Taught Courses at King Saud University:

• **Courses Taught At B.Sc. level:**

1. Math 101, Differential Calculus.
2. Math 102, Integral Calculus. Now it is named 111 Math Integral Calculus.
3. Math 103, General Mathematics I for Architecture students.
4. Math 104, General Mathematics II for Architecture students.
5. Math 105, Differential Calculus.
6. Math 106, Integral Calculus.
7. Math 109, Mathematics for Pharmacy Students.
8. Math 112, Mathematics for Pharmacy Students.
9. Math 151, Discrete Mathematics.
10. Math 200, Differential and Integral Calculus.
11. Math 201, Differential and Integral Calculus.
12. Math 202, Vector Calculus.
13. Math 203, Differential and Integral Calculus. (for Engineering students).
14. Math 204, Differential Equations.
15. Math 206, Multivariable Differential and Integral Calculus (For Actuarial and Financial Mathematics students)
16. Math 209, Differential Equations for Physics Students.
17. Math 280, Introduction to Real Analysis (For Actuarial and Financial Mathematics students).
18. Math 373, Introduction to Topology.

19. Math 380, Stochastic Processes (For Actuarial and Financial Mathematics students).
20. Math 487, Complex Analysis, (previously named as Math 385).
21. Math 481, Real Analysis II, (previously named as Math 384)
22. Math 482, Multivariable Calculus.
23. Math 499, Project. (8 projects given in the following subjects: Real Analysis, Complex Analysis, Differential
24. Math 1101, Mathematics.
25. Stat 1201, Statistics and Probability

• **Courses Taught At M.Sc. level:**

1. Math 581, Functional Analysis I.
2. Math 582, Functional Analysis II.
3. Math 585, Complex Analysis
4. Math 586, Potential Theory
5. Math 587, Summability theory.
6. Math 589, Selected Topics in Analysis.
7. Math 5391, Selected Topics in Mathematics.
8. Math 5821, Complex Analysis.
9. Math 5801, Measure Theory.
10. Math 5811, Functional Analysis.
11. Math 5991, Research Project.
12. Math 600, M.Sc. Thesis.

• **Courses Taught At Ph.D. level:**

1. Math 683, Complex Analysis 2.
2. Math 685, Harmonic Analysis.
3. Math 687, Geometric Function Theory.

4. Math 672, Variational Theory and Minimal Submanifolds.
5. Math 690, Advanced Topics in Mathematics.
6. Math 690, Research proposal.
7. Math 700, Ph.D. Thesis