Curriculum Vitae



Personal Informations

	Marouane RABAOUI
Male, born in Tur	nis, Tunisia.
Marital status :	Married, two children
Professional addr	ress : King Faisal University Department of Mathematics P.O.Box : 380 Al Hassa 31982 Saudi Arabia
Home adresse :	Université de Carthage Institut préparatoire aux Études d'Ingénieurs de Nabeul Campus Universitaire Merezka 8000 Nabeul Tunisia
e-mail :	mrabaoui@kfu.edu.sa
Actual position	
Researcher ID : Scopus ID :	Assistant Professor at King Faisal University Ministry of Higher Education, King Faisal University Department of Mathematics, Al-Hassa Saudi Arabia. P-5975-2016 24759745600
Orcid ID :	0000-0001-6726-8608
Preceding positi	lons
2008-2013	Research-Professor at the University of Carthage Department of Mathematics at the Preparatory Institute for Engineering Studies of Nabeul Holds the rank of Assistant Professor. Member of the Laboratory of Mathematical Analysis and Applications at the Faculty of Sciences of Tunis.
2007-2008	ATER (instructor) University of Pierre and Marie-Curie (Paris 6 University), Department of Mathematics.
2004-2007	Allocataire de recherche (Research grant from the French Ministry of Education, Higher Education and Research) Paul Verlaine University - Metz

Education

June 2012	Scientific Research stay CMCU Project University of Pierre and Marie-Curie (Paris 6 University) Department of Mathematics
February-March 2008	Scientific Research stay CMCU Project Faculty of Sciences of Tunis Department of Mathematics
2004-2007	PhD in Pure Mathematics Paul Verlaine University - Metz Laboratoire de mathématiques et applications de Metz (LMAM) and Institut de Ma- thématiques de Jussieu, University of Pierre and Marie-Curie (Paris 6 University)
	Thesis : Analyse harmonique en dimension infinie, paires de Guelfand généralisées Date and place of thesis defense : 30 november 2007, LMAM - Metz
	Thesis Jury : Pr. MUSTAPHA Sami (President), Pr. LUDWIG Jean (Examinators) Pr. OLSHANSKI Grigori et Pr. HILGERT Joachim (Reviewers) Pr. FARAUT Jacques et Pr. PASQUALE Angela (Advisors)
2003-2004	DEA (Master's Degree in research) in Pure Mathematics : Analyse et Géométrie Paris 6 University Mention Bien (magna cum laude)
2002-2003	Maîtrise de Mathématiques Pures (Master and Bachelor's Degree in Pure Mathe- matics) Faculty of sciences of Tunis Mention Bien (magna cum laude)- Presidential distinction
2000-2001	Diplôme universitaire d'études scientifiques (Two-year University degree in sciences) Faculty of sciences of Tunis Mention Trés Bien (summa cum laude - Ranked : First)

Research grants and Prizes

2003	President's Prize President's Prize for Outstanding Achievement in University Education Tunisia
2003-2004	Grant for the Master Degree Research grant from the Tunisian Ministry of Higher Education, Research and Tech- nology Tunisia
2004-2007	Grant for the Ph.D. Degree Research grant from the French Ministry of Education, Higher Education and Research Paul Verlaine University - Metz

Administrative tasks

Since 2016	Council Secretary Council Secretary of the Department of Mathematics and Statistics, College of Science, King Faisal University
Since 2014	Member (QAAA) Committee Member in the Quality Assurance and Academic Accreditation (QAAA) Committee for the Department of Mathematics and Statistics, College of Science, King Faisal University
Since 2013	Member in the Committee of Academic Orientation Member in the Committee of Academic Orientation for the Department of Mathema- tics and Statistics, College of Science, King Faisal University
Teaching	
Since September 2013	Assistant Professor Ministry of Higher Education, King Faisal University, Department of Mathematics, Al-Hassa, Saudi Arabia. Teached courses : General Mathematics, Principles of Algebra, Linear Algebra, Trans- formational Geometry, Calculus 2, Calculus 3, Partial Differential Equations, Functio- nal Analysis, Ordinary Differential Equations (Master's Degree), Integral Transforms (Master's Degree), Principles of Analysis, Complex Analysis, Topology, Foundation of Geometry, Differential forms and vector analysis.
2008-2013	Research-Professor University of Carthage Research-Professor at the Department of Mathematics in the Preparatory Institute for Engineering Studies of Nabeul Holds the rank of Assistant Professor
February-March 2008	Teaching activities within a scientific stay Faculty of sciences of Tunis Tutorials in Random Matrices (4 hrs) First year of the Master's Degree of Harmonic Analysis
February 2008	Qualifié aux fonctions de maître de conférences (Qualified for the position of As- sociate Professor) Section 25 of CNU : Mathematics N° of qualification : 08225191971 Date : 06/02/2008
2007-2008	ATER(instructor) Paris 6 University Tutorials in graduate Analysis (96 hrs)
2005-2006	Assistant in mathematics Paris 12 University - Val de Marne Tutorials in graduate Algebra (33 hrs)
2004-2005	Assistant in mathematics Paris 12 University - Val de Marne Tutorials in graduate Analysis (42 hrs)
2003-2004	Assistant in mathematics Paris 12 University - Val de Marne Tutorials in graduate Algebra (39 hrs)

Research field

Since the work of Wigner in the years 1950, the analysis of Random Matrices is one of the central subjects of the mathematical physics. It consists in studying the statistics of the eigenvalues of very large matrices. The mathematical tools used are for the majority derived from traditional analysis, but seen from a completely new point of view. There are essentially two approaches to these problems. The most traditional consists in considering initially the problem with fixed dimension, then to study the asymptotic one when dimension tends towards infinity. A second approach consists in being placed from the beginning in infinite dimension, the analysis of the Random Matrices is interpreted then within the framework of the infinite dimensional Harmonic Analysis. This second approach is well represented in the work of G Olshanski, A. Vershik, D. Voiculescu.

Our research topic is within the framework of this second approach. More precisely one proposes to exploit the non-commutative harmonic analysis, in particular the analysis of symmetric spaces, to study the spaces of infinite dimensional matrices under the action of infinite dimensional groups.

Summary of the Thesis

We first prove a generalisation of Bochner theorem. This result deals with Olshanski spherical pairs (G_{∞}, K_{∞}) which are defined as inductive limits of increasing sequences of Gelfand pairs $(G_n, K_n)_n$. By using Choquet's theorem, we establish a Bochner type representation of any element φ in the set $\mathcal{P}^{\natural}(G_{\infty})$ of K_{∞} -biinvariant continuous functions of positive type on G_{∞} . Such representation is given via a unique, positive and bounded measure μ by : $\varphi(g) = \int_{\Omega} \omega(g) \ d\omega$. Here Ω is the set of spherical functions of positive type on G_{∞} .

Then we consider the spherical pair $(U(\infty) \times U(\infty), (U(\infty) \times U(\infty)) \ltimes V_{\infty})$ where $V_{\infty} = M(\infty, \mathbb{C})$ is the infinite dimensional space of square complex matrices with only finite non zero coefficients, and $U(\infty)$ is the infinite dimensional unitary group. By using a result of G. Olshanski and A. Vershik, we determine the set Ω of spherical functions of positive type for the considered spherical pair. This enables us to find a parameterized version of the generalized Bochner theorem which we use to establish an integral representation of continuous functions of negative type in this case.

Keywords : Gelfand Pair, Bochner-Godement theorem, function of positive type, function of negative type, spherical function, spherical pair, inductive limit, generalized Bochner theorem.

Publications

- 1. **A Bochner Type Theorem for Inductive Limits of Gelfand Pairs** Annales de l'institut Fourier, 58 no. 5 (2008), p. 1551–1573
- 2. Asymptotic Harmonic Analysis on the Space of Square Complex Matrices Journal of Lie Theory 18 (2008), No. 3, 645–670
- 3. A Lévy-Khintchine formula for the space of infinite dimensional square complex matrices. Bull. Sci.math. 139 (2015) 283–300
- 4. Functions of negative type on the Olshanski spherical pair $(SL(\infty); SU(\infty))$. Journal of Lie Theory 27 (2017), No. 1, 237–250
- 5. Vanishing of the 1-Cohomology on Olshanski Spherical pairs. Preprint (2017).

Supervision and thesis jury

2014 Reviewer and member of Jury

Designed as a reviewer and a jury member of the master's degree thesis of Reem Fahad Al Subaie entitled : Transmutation operators associated with a Bessel type operator on $]0, \infty[$ and certain applications. University of Dammam, Department of Mathematics,

Saudia Arabia

2017 Reviewer and member of Jury

Designed as a reviewer and a jury member of the master's degree thesis of Ashwaq Al-Mutair entitled : *Continuous selections of solution sets of semilinear differential inclusions of fractional order.* King Faisal University, Department of Mathematics, Saudia Arabia

Selection of invited talks and attended conferences

2004-2005	Participation in the Workshop of the International Research Training Group Paderborn-Germany
2005-2006	Participation in the Workshop of the International Research Training Group Metz-France, with the talk :" Is there a Bochner type theorem for Olshanski's spherical pairs ?"
2005-2006	Participation in the 14th collocium of the Tunisian Society of Mathematics (SMT) Hammamet-Tunisia
2006-2007	Participation in the International Conference on Harmonic Analysis and Appli-
	cations Sousse-Tunisia, with the talk : "Une généralisation du théorème de Bochner"
2006-2007	Participation in the 15th collocium of the Tunisian Society of Mathematics (SMT) Sousse-Tunisia
2006-2007	Invitation to the Metz-Nancy-Reims-Strasbourg days in 2007 Nancy-France. Participation with the talk : "A Bochner Type Theorem for Inductive Limits of Gelfand Pairs"
2007-2008	Invitation to a scientific stay at the faculty of sciences of Tunis Participation with the talk : "Un théorème de type Bochner pour les paires sphériques d'Olshanski et applications"
2011-2012	Invitation to a scientific stay at University of Pierre and Marie-Curie (Paris 6 University)
2012-2013	Participation in the 12th International Symposium of Orthogonal Polynomials, Special Functions and Applications Sousse-Tunisia

Miscellaneous

Languages : Arab (native language), French (fluently written and read and spoken), English (fluently written and read)

Technical skills : Windows, Linux, Latex, Emacs, Maple, Matlab, Adobe and the softwares of Windows.

Referees

Professor Jacques Faraut Equipe d'analyse algébrique Institut de Mathématiques de Jussieu 175, Rue Chevaleret 75013 Paris, France E-mail : faraut@math.jussieu.fr

Professor Angela Pasquale
 Laboratoire de Mathématiques et Applications de Metz
 UMR 7122, Université de Metz et CNRS
 Bâtiment A, Ile de Saulcy
 57045 Metz Cedex 01, France
 E-mail : pasquale@math.univ-metz.fr

3. Professor Sifi Mohamed

Laboratoire d'Analyse Mathématiques et Applications Faculté des sciences de Tunis Campus Universitaire El Manar 2092 Tunis Tunisie E-mail : mohamed.sifi@fst.rnu.tn

4. Professor Sami Mustapha

Equipe d'analyse algébrique Institut de Mathématiques de Jussieu 175, Rue Chevaleret 75013 Paris, France E-mail : sam@math.jussieu.fr