Curriculum vitae

Last update: Friday April 22, .16

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Algerian Nationality
Born in August 1st, 1969 in Algeria
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1 Research Interests

- Simulation using COMSOL Multiphysics Software
- Simulation for Thermohaline Convective Problems
- Finite Volume and Finite Element Methods
- Improving Convergence Order of these two previous Methods
- Numerical Schemes Approximating Coupled Problems with Irregular Data
- Oblique Derivative Problems and their Approximations
- Defect Correction
- Domain Decomposition
- Volume Approximation for Thermohaline Convective Problems
- Improving Converegence Order of Finite Volume Approximate Solutions of Hyperbolic Equations
- Discontinuous Galerkin finite element method
- A Posteriori estimate in Finite Volume method
- Uses of COMSOL Multiphysics (Femblab)
- Numerical approximation for singular perturbed equations
- Higher order in finite volume methods for time–independent Navier Stokes equations
- Numerical approximation of equations arising in Physics and Mechanics, e.g. Schrödinger equation

2 Education

- December 9th 2009: Algerian Habilitation (HDR) at the departement of Mathematics–University of Annaba, Algeria.
  Experts (Referees) of my Habilitation:
  - Prof. Robert Eymard, University of Marne la Vallée, Paris, France

  - Prof. Fayssal Benkheldoun, University of Paris Sud, Paris, France
  - Prof. Ammar Boukhmis, University of Annaba, Algeria

- November 14th 2005: Ph.D Thesis in Applied Mathematics, University of Marseille, France. Thesis Advisor: Prof. T. Gallouët.
  Title of Thesis: Improved Convergence Order in Finite Volume and Finite Elements Methods.
  Referees of my Thesis:
  - Prof. Yvon Maday, University of Paris 6, France
  - Prof. Mohand Moussaoui, University of Lyon, France
- Nov. 2002–Nov. 2005 : University of Marseille, France, Ph.D in Applied Mathematics
- July 1996 : Master in Applied Mathematics, Annaba, Algeria
- Sep. 1994–July 1996: University of Annaba, Algeria, Master in Applied Mathematics
- 1988–1993 : B.A. in Mathematics, Annaba, Algeria.

3 Scientific Activities

- Reviewer for Mathematical Reviews of American Mathematical Society (AMS) since March 31, 2008
- Reviewer for Zentralblatt MATH since April 23, 2008
- Chairman for a session in the International Symposium on Finite Volume for Complex Applications VI, Prague: http://fvca6.fs.cvut.cz/
- Reviewer for Journal of the Franklin Institute
- Reviewer for Journal of Mathematical Research (JMR)
- Honorary Peer Reviewer for Global Journal Science Frontier Research (GJSFR)

4 Positions

- Since January 2015: Full Professor at the University of Annaba, Algeria.
- Till December 2014: Associate Professor (Maître de Conference) (rank “A”) at the University of Annaba, Algeria.
- Since 1999: ”Enseignant Chercheur” at the University of Annaba, Algeria.
- June 1st 07–December 31 st 2007 : Postdoc in Nečas Center of Mathematical Modeling, Prague, Czech Rep.
- March 1 st 06–Mai 31 st 07 : Postdoc in WIAS: Weierstrass Institute for Applied Analysis and Stochastics, Berlin, Germany
- Sept. 04–Aug. 05 : Teaching Assistant with T. Gallouët, University of Marseille, France
- Sep. 99–Nov.02 : Lecturer in Mathematics, University of Annaba, Algeria
- April 99–July 99 : Lecturer in Mathematics, University of Tebessa, Algeria
- Sep. 97-March 99 : Military Service; Mars 15th 98–Mars 15th 99: Teacher of Mathematics in ”Académie Militaire Interarmes” (AMIA) de Cherchell, Algérie
- Oct. 93-Jan.97 : Lecturer in Mathematics, University of Annaba, Algeria

5 Supervision

- Supervising of Ms. "Loujani, Nour El-Houda" in Master 2, Department of Mathematics–University of Annaba in Algeria, in a subject on "Error Estimates for the Finite Volume Approximation for the Heat Equation". "Memoire" defended in June, 2014.
- Supervising of Ms. "Guenadil, Assia" and Mr. "Bouabda, Achour" in Master 2, Department of Mathematics–University of Annaba in Algeria, in a subject on "Numerical Methods for Schrödinger equation ". "Memoire" defended in June 19th 2013.
- Supervising of Ms. "Sebti, Habiba" in Master 2, Department of Mathematics–University of Annaba in Algeria, in a subject on "Numerical Methods for Fractional derivative Equations". "Memoire" defended in June 19th 2011.
- Supervision with R. Herbin of two students of Master 2, University of Marseille I–France, in a project entitled: Coupled System with Irregular Data.

6 Expert for theses

6.1 Expert for Ph.d theses

- Expert for the Ph.d thesis of Mrs. "Aicha Assala". Thesis entitled "Etude Mathématique et Numérique de certains Problèmes des Milieux Poreux". Thesis defended September, 2014 in the University of Annaba-Algeria.
- Expert for the Ph.d thesis of Mrs. "Nowel Ouanes". Thesis entitled "Cycles Limites des Systèmes Différentiels de Liénard perturbés". Thesis defended Wednesday June 26, 2014 in the University of Annaba-Algeria.
- Expert for the Ph.d thesis of Mr. "Kara, Mohamed". Thesis entitled "Calcul des Modes de Torsion et la Méthode de Domaines Fictifs pour les Problèmes d'Elasticité Plane avec des Conditions aux Limites Générales". Thesis defended September 28th 2013 in the University of Setif-Algeria.

6.2 Expert for Magister

- Expert for the Magister thesis of Mr. "Boulares Salah". Thesis entitled "Discrétisation et Résolution Numérique de quelques Problèmes aux Limites". Thesis defended Thursday June 25, 2014 in the University of Annaba-Algeria.

7 Some selected courses taught in Post graduation

- 2013/2014–2014/2015: Course in "Finite Volume Methods". Master 2 in the Department of Mathematics (Master of Special Functions), University of Annaba-Algeria.
- 2011/2012 and 2012/2013: Course in "Numerical Methods for some Known Models in Physics". Master 2 in the Department of Physics (Master of Theoretical Physics), University of Annaba-Algeria.
- 2013/2014 (First Semester): Course in "Numerical Methods". Master 1 in the Department of Metallurgy and Materials Engineering (Master of Mise en Forme), University of Annaba-Algeria.

- 2013/2014 (Second Semester): Course in "Numerical Methods". Master 1 in the Department of Metallurgy and Materials Engineering (Master of Traitement de Surface), University of Annaba-Algeria.
- 2009/2010 (Second Semester): Course in "Numerical Methods". Master 1 in the Department of Metallurgy and Materials Engineering, University of Annaba-Algeria.

8 Some selected courses taught in graduation and under graduation

- 2011/2012, 2012/2013, and 2013/2014: Course in "Application of Mathematics". Second year under graduation in the Department of Mathematics, University of Annaba–Algeria.
- 2004/2005: Analysis, Undergraduate
- 1999/2000: Analysis, Statistics, Numerical Analysis, Algebra, Undergraduate.
- April 99–July 99 : Finite Difference methods for Partial Differential Equations, Graduate.
- Oct. 93–Junuary 97 : Analysis and Algebra, Undergraduate.
- 2009 till now: Finite Difference methods and Finite Volume methods, Post Graduate.
- Supervision with R. Herbin of two students of Master 2, University of Marseille I–France, in a project entitled: Coupled System with Irregular Data.

9 Publications

The link https://www.i2m.univ-amu.fr/~bradji/publications.html is more updated than the information included in this section.

9.1 Submitted for publication

- Error estimates of finite volume gradient schemes for elliptic and parabolic equations with linear oblique derivative boundary conditions.
- Convergence analysis of some new first order and second order time accurate finite volume gradient schemes for semilinear parabolic equations in any space dimension.

9.2 Articles in Journals

- Convergence analysis of some first order and second order time accurate gradient schemes for semilinear second order hyperbolic equations.
  Accepted March 31-2016 in Numerical Methods for Partial Differential Equations.
- A theoretical analysis for a new finite volume scheme for a linear Schrödinger evolution equation on general nonconforming spatial meshes.
  Numerical Functional Analysis and Optimization, 36/5, 590–623, 2015.
- A theoretical analysis of a new second order finite volume approximation based on a low–order scheme using general admissible spatial meshes for the one dimensional wave equation.
  JMAA (Journal in Mathematical Analysis and Applications), 422/1, 109–147, 2015..

- A full analysis of a new second order finite volume approximation on a low order scheme using general admissible spatial meshes for the unsteady one dimensional heat equation.
  JMAA (Journal in Mathematical Analysis and Applications), 416/1, 258–288, 2014.
- Some new error estimates for finite element methods for the acoustic wave equation using the Newmark method.
  With Jürgen Fuhrmann. Mathematica Bohemica, 139/2, 125–136, 2014
- A new error estimate for a Crank–Nicolson finite element scheme for parabolic equations.
  With Jürgen Fuhrmann. Mathematica Bohemica, 139/2, 113–124, 2014.
- An analysis of a second order time accurate scheme for a finite volume method for parabolic equations on general nonconforming multidimensional spatial meshes.
  Applied Mathematics and Computation, 219/11, 6354–6371, 2013.
- Convergence analysis of some high–order time accurate schemes for a finite volume method for second order hyperbolic equations on general nonconforming multidimensional spatial meshes.
  Numerical Methods for Partial Differential Equations, 29/4, 1278–1321, 2013.
- A theoretical analysis of a new finite volume scheme for second order hyperbolic equations on general nonconforming multidimensional spatial meshes.
  Numerical Methods for Partial Differential Equations, 29/1, 1–39, 2013.
- Some abstract error estimates of a finite volume scheme for a nonstationary heat equation on general nonconforming multidimensional spatial meshes, 31 pages.
  With J. Fuhrmann. "Applications of Mathematics, Praha", 58/1, 1–38, 2013.
- Error estimates of the discretization of linear parabolic equations on general nonconforming spatial grids.
  With J. Fuhrmann. Comptes rendus - Mathématique 348/19-20 , 1119–1122, 2010.
- Some simples error estimates for finite volume approximation of parabolic equations.
  Comptes Rendus de l'Académie de Sciences, Paris, 346/9-10 pp. 571-574, 2008.
- Discretization of the coupled heat and electrical diffusion problems by the finite element and the finite volume methods.
  With R. Herbin. IMA Journal of Numerical Analysis, **28** (3), 469–495, 2008.
- Optimal defect corrections on composite nonmatching finite element meshes.
  With A.-S. Chibi. IMA Journal of Numerical Analysis, **27** (4), 765– 780, 2007
- Error Estimate for Finite Volume Approximate Solutions of Some Oblique Derivative Boundary Problems.
  With T. Gallouët. International Journal on Finite Volumes. **3** (2), 35 pages (electronic), 2006
- Impropved Convergence Order for Finite Volume Solutions. Part I: 1D Problems.
  With B. Atfeh. Arab Journal of Mathematical Sciences. **11** (1), 1–30, 2005.
- Impropved Convergence Order for Finite Volume Solutions. Part II: 2D Problems.
  With B. Atfeh. Arab Journal of Mathematical Sciences. **11** (2), 1–53, 2005.

9.3 Articles in Peer Reviewed Proceedings

- Note on a new piecewise linear finite element approximation of order four for one dimensional second order elliptic problems on general meshes.
  Proceedings of MAMERN VI 2015, 175–185 (2015), B. Amaziane et al. (Eds), ISBN 978-84-338-5783-5

- Some discrete a priori estimates for a finite volume scheme appearing in the discretization of a time dependent Joule heating system
  Proceedings of MAMERN VI 2015, 187–197 (2015), B. Amaziane et al. (Eds), ISBN 978-84-338-5783-5
- A convergence order for a finite volume scheme for a semilinear parabolic equation.
  Proceedings of MAMERN VI 2015, 199–2010 (2015), B. Amaziane et al. (Eds), ISBN 978-84-338-5783-5
- Note on the convergence of a finite volume scheme using a general nonconforming mesh for an oblique derivative boundary value problem.
  Springer Proceedings in Mathematics and Stochastics, V. 77, 2014, 149–157: Finite Volumes for Complex Applications VII, Methods and Theoretical Aspects (Fuhrmann et al. Eds.).
- A new finite volume scheme for a linear Schrödinger evolution equation.
  Springer Proceedings in Mathematics and Stochastics, V. 77, 2014, 127–135: Finite Volumes for Complex Applications VII, Methods and Theoretical Aspects (Fuhrmann et al. Eds.).
- A note on a new second order approximation based on a low-order finite volume scheme for the wave equation in one space dimension.
  Springer Proceedings in Mathematics and Stochastics, V. 77, 2014, 137–147: Finite Volumes for Complex Applications VII, Methods and Theoretical Aspects (Fuhrmann et al. Eds.).
- Some second order time accurate for a finite volume method for the wave equation using a spatial multi-dimensional generic mesh.
  Handlovicova et al. (ed.), Algoritmy 2012. Proceedings of contributed papers and posters. Bratislava: Slovak University of Technology, Faculty of Civil Engineering. 342–352 (2012).
- Some abstract error estimates of a finite volume scheme for the wave equation on general nonconforming multidimensional spatial meshes.
  Proceedings of International Symposium of Finite Volume for Complex Applications Edited by J. Fort et al., Springer Proceedings in Mathematics 4, 175–183, 2011.
- Some Error Estimates for the Discretization of Parabolic Equations on General Multidimensional Non-conforming Spatial Meshes.
  With J. Fuhrmann. I. Domov et al. (Eds), NMA 2010, LNCS 6046, 369–376, 2011. Springer–Verlag, Berlin Heidelberg 2011.
- Towards an approach to improve convergence order in finite volume and finite element methods.
  Proceedings of ICNAAM "International Conference in Numerical Analysis and Applied Mathematics", Edited by T. E. Simos, G. Psihoyios, and Ch. Tsitouras, 1162–1165, 2009
- Some error estimates in finite volume methods for parabolic equations.
  With J. Fuhrmann. Finite Volumes for Complex Applications V, Proceedings of the 5th International Symposium on Finite Volume for Complex Applications/ edited by R. Eymard and J.-M. Hérard, Wiley, 233–240, 2008.
- On the discretization of Ohmic losses.
  With R. Herbin. Proceedings of Tamtam, 2007,Tipaza, Algeria, 217–222. AMNEDP-USTHB, 2007.
- On the discretization of the coupled heat and electrical diffusion problems.
  With R. Herbin. Numerical Methods and Applications. 6 th International Conference, NMA 2006, Borovets, Bulgaria, Aug. 20–24, 2006. Lecture Notes in Computer Science 4310 Springer 2007, pp. 1–15.

- Finite volume approximation for an oblique derivative boundary problem.
  with T. Gallouët. Finite Volumes for Complex Applications IV, Proceeding of the 4th International Symposium on Finite Volume for Complex Applications/edited by F. Benkhaldoun, D. Ouazar, and S. Raghay, Hermes-Penton, pp. 143–152, 2005.
- Improved convergence order of finite solutions and application in finite elements methods. Proceedings of ICNAAM: International Conference in Numerical Analysis and Applied Mathematics, Simos, G. Psihoyios and C. Tsitouras (eds), Wiley -VCH, pp. 94-98, 2005.

10 Contributions using COMSOL Multiphysics

- Convergence rates for models with coupled 1D/2D subdomains.
  With E. Holzbecher and M.-S. Litz. COMSOL Conference of Paris, 2010.
- On the convergence order of the COMSOL solutions in Sobolev norms.
  With Holzbecher. CD Proceedings of the COMSOL Conference of Budapest, November 2008.
- On the convergence order of the COMSOL solutions.
  With Holzbecher. CD Proceedings of the COMSOL Conference of Grenoble, October 2007.

10.1 Technical Reports and Preprints

- Numerical schemes to a non linear elliptic system with irregular data. Preprint.
  With R. Herbin.
- Some improvements of convergence order of finite volume solutions. Preprint of LATP n 04-13 .
  with B. Atfeh.
- Improved Convergence Order of Finite Element Solutions on Non-Uniform Meshes. Part I: 1D Problems.
- Improved Convergence Order of Finite Element Solutions on Non-Uniform Meshes. Part II: Bilinear Finite Elements on Rectangular Region.
- Improved Convergence Order of Finite Volume Solutions for Unstructured Meshes on Rectangle.
- Improved Convergence Order of Finite Volume Solutions for some Nonlinear and Parabolic Equations.
- Defect correction and discrete Schwarz method for second order boundary value problems. Preprint of the Department of Mathematics, Annaba, Algeria, 2001.
  With A.-S. Chibi.
- Une contribution à l'amélioration de convergence de la méthode des éléments finis sur une région circulaire. Preprint of the Department of Mathematics, Annaba, Algeria n26, 1998.
  With A.-S. Chibi.

11 Talks and Workshops

- Towards an approach to improve convergence order in finite volume and finite element methods. In "International Conference in Numerical Analysis and Applied Mathematics", Greece, September, 2009.
- On the convergence order of the COMSOL solutions.
  Presented by E. Holzbecher in the COMSOL Conference of Grenoble, October 2007.

- On the discretization of ohmic losses.
  Oral Presentation by R. Herbin in " TAMTAM07, 3 éme Colloque sur les Tendances dans les Applications Mathématiques en Tunisie, Algerie, Maroc". 14–15 Avril 2007.
- Verification of thermohaline simulations, 5th Colloquium of the DFG Priority Program SPP 1135 "Dynamics of Sedimentary Systems under Varying Stress Regimes: The Example of the Central European Basin", Geseke-Eringerfeld, November 15–17, 2006.
  With Fuhrmann, j., Enchery, G., Bayer, U., and Margi, F.
- Numerical Schemes for Ohmic Losses.
  With Raphaele Herbin. Oral Presentation in the Workshop of "Modelling and Simulation of PEM Fuel Cells", September 18-20, 2006. WIAS, Berlin, Germany.
- Improved Convergence Order of Finite Solutions and Application in Finite Elements Methods.
  Oral Presentation in International Conference on Numerical Analysis and Applied Mathematics, ICNAAM , September 16-20, 2005, Rhodes, Greece.
- Finite Volume Approximation for an Oblique Derivative Boundary Probem.
  With Thierry Gallouët. Oral Presentation In the Fourth International Symposium in Finite Volumes for Complex Applications-Problems and Perspectives, July 4-8, 2005, Morocco.
- Towards highly accurate approximations through defect correction and discrete Schwarz method.
  With A.-S. Chibi. Oral Presentation by A. -S. Chibi in the Second International Conference on Mathematical Sciences ICM December 2004, United Arab Emirates University.
- Amélioration de l'Ordre de Convergence pour l'Approximation de Problèmes elliptiques.
  With Bilal Atfeh. Oral Presentation in "Congré National d'Analyse Numérique", June 2004.
- Some Improvements of Convergence Order of Finite Volume solution.
  Work-Shop of Volumes finis/Galerkin Discontinu , organized by Pr. R. Herbin in CMI, Marseille.
- Defect Correction Technique through Domain Decomposition Method.
  "Séminaire d'Analyse Appliquée e au CMI, univ. de Provence, Marseille,
  http://www.latp.univ-mrs.fr/equipes/analyse_appliquee/eqANAP-seminaire.html
- On the Dependence of the Convergence of the Corrections on Subdomains on the Degree of the Interpolation Operators.
  With Ahmed Salah Chibi. Oral Presentation in the Third Mathematical Colloque in Analysis and its Applications, 2002, Algeria.
- "Sur la Convergence de l'Alternative de Schwarz Discrete Accelerée".
  With Ahmed Salah Chibi. Oral Presentation in the Meeting of Algerian Mathematiciens RMA, 2000, Algeria.
- "Une Contribution à l'Amélioration de Convergence de la Méthode des Eléments Finis sur une Région Circulaire".
  With Ahmed Salah Chibi. Oral Presentation in the "Congré National de Mathématiques", Annaba, Algeria, 1999.

12 Invitation and Lectures

- March 10th 2009 at 11 AM: Invited for an interview for scientific research position in the scientific French organization CNRS. Unfortunately I could not reach "Institut Henri Poincaré" (IHP) in Paris, where my

interview is scheduled, because I had no ticket flight from Algeria to Paris.

- Colloquium Tuesday, January 15th, 2008, in the Department of Mathematics and Statistics of Memorial University, St Johns, Newfoundland–Canada.
- Lecture in Necas Center of Mathematical Modeling, June 2007.
- Invited to do a Seminar, by Departamento de Matematica, Instituto Superior Tecnico, Lisboa, Portugal (June 2006).
- Invited by the Weierstrass Institute for Applied Analysis and Stochastics of Berlin WIAS , February 2006. Title of the talk: Finite Volume Methods for Elliptic Problems.

13 Funded algerian projects

- Chef of the CNEPRU project "Les Méthodes de Volumes et Eléments Finis pour Quelques Modèles en Dynamique de Fluide". Agreed for 4 (four years) starting from January 2015.
- Chef of PNR project "Etude Mathématique et numériques de quelques modeles de dynamique de Gaz, exemple systeme des equation d'Euler de la dynamique de Gaz".
- Chef of the CNEPRU project "L' Analyse mathématique et numérique de la récupération assistée des hydrocarbures" (Mathematical and numerical analysis of enhanced oil recovery).