Gregorio Chinni

Curriculum vitae

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Italy
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Citizenship: Italian
Date of birth: 28/11/1980
Status: married

Education

2008	**PhD in Mathematics**, *Department of Mathematics University of Bologna*, Bologna, Italy.
01/10/2004	**Laurea in Mathematics**, *Department of Mathematics University of Bologna*, Bologna, Italy.

Employment:

10/2022-present	**Junior assistant professor (fixed-term)**, *Department of Mathematics*, University of Bologna, Italy.
09/2021-06/2022	**High school teacher**, *Liceo Scientifico Leonardo da Vinci*, Casalecchio di Reno, Italy.
09/2020-06/2021	**High school teacher**, *Liceo Scientifico Copernico*, (Indirizzo Linguistico), Bologna, Italy.
2017-2019	**Principal Investigator**, *University of Vienna*, *FWF Lise-Meitner Program fellowship*, Vienna, Austria. Research project: "Regularity of solutions for PDE and perturbation problem"; Austrian co-applicant: Prof. Bernahard Lamel.
2013-2015	**Postdoctoral Fellow**, *University of Saõ Paulo, USP, Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP) fellowship*, Saõ Paulo, Brazil. Research project: "Regularity of solutions for sums of squares of real and complex vector fields"; Supervisor: Prof. Paulo Domingos Cordaro.
2009-2012	**Postdoctoral Fellow**, *University of Bologna, UNIBO*, Bologna, Italy. Research project: "Analytic Hypoellipticity for sums of squares of vector fields"; Supervisor: Prof. Antonio Bove.
Jun-Dec 2008	**Scholarships**, *University of Bologna*, Bologna, Italy..

PhD thesis

Title   *Analytic and Gevrey (micro-)hypoellipticity for sums of squares: an FBI approach,*

Supervisor   Prof. Antonio Bove

Description   The thesis has two parts. The first part is an introduction to some topics in the subject and to the techniques used. The second part contains: a theorem of minimal microlocal Gevrey regularity, using FBI techniques, for operators that are sums of squares of vector fields with real analytic coefficients, microlocal version of a theorem of Derridj and Zuily (Journal de Mathématiques Pures et Appliquées, 52(1973), 309-336); a new proof of both analytic and C^∞- hypoellipticity of Kohn's operator (J. J. Kohn, M. Derridj and D. S. Tartakoff Ann. of Math. 162 (2005), 943–986) using FBI techniques, the same proof allows to obtain both kind of hypoellipticity at the same time.

Experience

Teaching

- Teacher, a.a. 2022/2023. Mathematical Analysis T-1 (Modulo 2, 45 hours), Mathematical Analysis T-2 (Modulo 2, 15 hours), First cycle degree programme (L) in Automation Engineering.
- Teaching assistant, a.a. 2021/2022. Calculus I (45 hours), Calculus II (45 hours), Faculty of Computer Science and Computer Science for the Management, University of Bologna.
- Teaching assistant, a.a. 2020/2021. Calculus I(45 hours), Faculty of Computer Science and Computer Science for the Management, University of Bologna.
- Teaching assistant, a.a. 2019/2020. Calculus II(30 hours), Faculty of Computer Science and Computer Science for the Management, University of Bologna.
- Teaching assistant, a.a. 2017/2018. Courses: Analysis II, Department of Physics, Calculus I(45 hours), Faculty of Computer Science and Computer Science for the Management, Calculus II(45 hours), School of Engineering, University of Bologna.
- Teaching assistant, a.a. 2016/2017. Courses: Analysis II(45 hours), Department of Physics, Calculus I(45 hours), Calculus II(30 hours), Faculty of Computer Science and Computer Science for the Management, Calculus II(45 hours), School of Engineering, University of Bologna.
- Teaching assistant, a.a. 2011/2012. Courses: Calculus I(45 hours), Calculus II(45 hours), School of Engineering, University of Bologna.
- "Crash course in mathematics" (20 hours), September 2008, Department of Economics, University of Bologna.
- Teaching assistant for the years 2007-2010, both in Mathematics and Economics Department, University of Bologna (45 hours per year).

Talks and Poster Sections:

- "On the regularity of solutions and of analytic vectors for sums of squares", Seminario di Analisi Matematica Bruno Pini, Bologna University, 27/01/2022;
- "On the microlocal regularity of the analytic vectors for "sums of squares" of vector fields", Virtual East-West Several Complex Variables seminar, 15/12/2020;
- "On the sharp Gevrey regularity for a generalization of the Métivier Operator" 10th Workshop on GEOMETRIC ANALYSIS OF PDEs and SEVERAL COMPLEX VARIABLES, Serra Negra Brazil, august 05-09, 2019;
- "On the sharp Gevrey regularity for a generalization of the Métivier Operator", University of São

Paulo, IME-USP, 01/08/2019;

- "On the sharp Gevrey regularity for a generalization of the Métivier Operator", Third Central European Complex Analysis Meeting, 12-14/04/2019;
- " Analytic and Gevrey Hypoellipticity for Perturbed Sums of Squares Operators",I Workshop INDAM "Methods of Real Analysis and Theory of Elliptic Systems", Roma, 17-21/09/2018;
- " On the (semi-)global analytic hypoellipticity for some models of sums of squares", short talk, "7th IST-IME A conference in Analysis and Applications in honor to Prof. Paulo Cordaro on occasion of his 65th birthday", ICM2018 Satellite Conference, Instituto de Matemática e Estatística Universidade de São Paulo, 23-27/07/2018;
- " Analytic and Gevrey Hypoellipticity for Perturbed Sums of Squares Operators", University of Vienna, 09/01/2018;
- " Analytic and Gevrey Hypoellipticity for Perturbed Sums of Squares Operators", 9th Workshop on GEOMETRIC ANALYSIS OF PDEs and SEVERAL COMPLEX VARIABLES, Serra Negra Brazil, august 07-11, 2017;
- " The Green Operator of a Globally Analytic Hypo-elliptic Operator on the Torus and Applications", Seminario di Analisi Matematica Bruno Pini, Bologna University, 19 November 2015;
- " The Green Operator of a Globally Analytic Hypo-elliptic Operator on the Torus and Applications", 8th Workshop on GEOMETRIC ANALYSIS OF PDEs and SEVERAL COMPLEX VARIABLES, Serra Negra Brazil, august 03-07, 2015;
- "Perturbation of Globally Gevrey Hypo-elliptic Operators", Special Session on Recent Progress in Harmonic Analysis and Several Complex Variables I, Fall Western Sectional Meeting San Francisco State University, San Francisco, CA, October 25-26, 2014;
- "On the Hypo-ellipticity of Kohn's Operator (an alternative Proof)", São Paulo, IME-USP, november 2013;
- "Hypoellipticity in the sense of germs for Kohn's Operator ", CR Geometry and PDE's - V In honor of J.J. Kohn in his 80th birthday, Levico Terme (Trento Italy), June 5-8, 2012;
- "On the hypoellipticity of Kohn's operator and one of its variations", Temple University, april 2012.

Study abroad:

- 16/07/2019-04/08/2019, University of São Paulo (Prof. P.D. Cordaro);
- 01/03/2012-30/04/2012, Temple University (Advisor Prof. S. Berhanu).
- 13-17/09/2010, Second Summer School on Analysis,"Spectral Theory and PDE", Leibniz University Hannover, Germany.

Publications

1) *Minimal Microlocal Gevrey Regularity for "Sums of Squares"* , Int. Math. Res. Notices, **12**, 2275-2302, 2009 (with P. Albano, A. Bove)
2) *A Proof of Kohn's Operator Hypoellipticity via FBI*, Revista Matemática Iberoamericana, **27** (2011), 585-604.
3) *Germ Hypoellipticity and loss of derivative* , Proc. Amer. Math. Soc. **140** (2012), 2417-2427.
4) *Gevrey Regularity for a generalization of the Oleĭnik-Radkevič Operator*, Journal of Mathematical Analysis and Applications, **415**(2014), 948-962.
5) *Lower order perturbation and global analytic vectors for a class of globally analytic hypoelliptic operators*, Proc. Amer. Math. Soc. **144**, No. 12 (2016), 5159–5170 (with N. Braun Rodrigues, P. D. Cordaro and M. R. Jahnke.)

6) *On global analytic and Gevrey hypoellipticity on the torus and the Métivier inequality.* Comm. in Partial Differential Equations **42**, No. 1 (2017), 121–141 (with P.D. Cordaro.)

7) *Analytic and Gevrey hypoellipticity for perturbed sums of squares operators*, Annali di Matematica Pura ed Applicata, **197**, Issue 4 (2018), 1201–1214 (with A. Bove)

8) *On the Gevrey regularity for sums of squares of vector fields, study of some models*, Journal of Differential Equations, **265**, no. 3, (2018), 906–920.

9) *(Semi-)Global analytic hypoellipticity for a class of "sum of squares" which fail to be locally analytic hypoelliptic*, Proc. Amer. Math. Soc., **150** (2022), 5193-5202.

10) *On a Class of Globally Analytic Hypoelliptic Sums of Squares* (with A. Bove), Journal of Differential Equations, **327**, (2022), 109–126.

11) *On the microlocal regularity of the analytic vectors for "sum of squares" of vector fields* (with M. Derridj), Mathematische Zeitschrift (2022), `DOI:10.1007/s00209-022-03129-x`.

12) *On the regularity of the solutions and of analytic vectors for "sums of squares"*, Bruno Pini Mathematical Analysis Seminar, **13** No. 1 (2022): Seminars 2022.

13) *On the sharp Gevrey regularity for a generalization of the Métivier Operator*, Math. Ann. (2023). `DOI: 10.1007/s00208-022-02558-7`.

14) *On a class of sums of squares related to Hamiltonians with a non periodic magnetic field* (with A. Bove and M. Mughetti), Journal of Mathematical Analysis and Applications, **526**(2)(2023), `DOI: 10.1016/j.jmaa.2023.127303`.

15) *On the partial and microlocal regularity for generalized Métivier operators*, J. Pseudo-Differ. Oper. Appl. **14**, 38 (2023). `DOI: 10.1007/s11868-023-00534-6`.

Preprints and Works in progress

- *On the Microlocal Regularity of the Gevrey Vectors for second order partial differential operators with non negative characteristic form of first kind* (with M. Derridj), Preprint.
- *On a sum of squares operator related to the Schrödinger equation with a magnetic field* (with A. Bove), in preparation.
- *On a class of globally analytic hypoelliptic partial differential operators with non negative characteristic form* (with N. Braun Rodrigues and M. R. Jahnke.), in preparation.

Languages

Italian	**native speaker**
English	**good command / good working knowledge**
Portuguese	**good command / good working knowledge**

Research Interests

Analytic and Gevrey Hypoellipticity for sums of squares operators with real analytic coefficients which satisfy the Hörmander condition. Hypoellipticity for sums of squares of complex analytic vector fields. Global regularity for sums of squares defined on the torus and on product of compact Lie group by a compact manifold. Local and global perturbation problem for analytic linear partial differential operators i.e. stability of the regularity of the solutions after pseudo-differential operator lower order perturbations. Gevrey regularity of analytic/Gevrey vectors for linear partial differential operators with analytic and Gevrey coefficients. Microlocal Gevrey regularity for non-linear first order partial differential equation, via construction of approximate solution. The main tools used are apriori estimates, construction of parametrices and the F.B.I. technique.

Grants and Awards:

2017 **FWF-Lise Meitner-Programme**, *project no. M2324-N35*, Austrian Research Foundation, (FWF).

2013 **Fundação de Amparo à Pesquisa do Estado de São Paulo**, *Processo FAPESP no. 2013/08238-6*, São Paulo Research Foundation, (FAPESP).

Community service:

Reviewer for Mathematical Reviews(MR), Referee for Journal of Fourier Analysis and Applications, Journal of Mathematical Analysis and Applications.

Date: June 8, 2023   Signature ―――――――――――

(Gregorio Chinni)