RAHUL RAJU PATTAR

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Department of Mathematics and Computer Science
Sri Sathya Sai Institute Higher Learning

RESEARCH INTERESTS

Hyperbolic partial differential equations with rough coefficients and/or initial data, $L^p - L^q$ estimates, pseudodifferential operators, microlocal analysis, metric on the phase space, Colombeau algebras of generalized functions.

EDUCATION

Sri Sathya Sai Institute Higher Learning *May, 2022*
PhD, Mathematics (defended on 24^{th} May, 2022)
Thesis: Global Well-posedness and Regularity Issues Associated with Singular Hyperbolic Cauchy Problems
Advisor: Dr. N Uday Kiran

Sri Sathya Sai Institute Higher Learning *2015-2017*
M.Sc. in Mathematics with distinction (gold medal for academic excellence) *CGPA: 9.0/10*

Sri Sathya Sai Institute Higher Learning *2012-2015*
B.Sc.(Hons) in Mathematics with distinction *CGPA: 8.5/10*
Major in Mathematics and minor in Physics and Chemistry

SCHOLARSHIPS AND AWARDS

UGC-CSIR Senior Research Fellowship *2019-2022*
University Grants Commission-Council of Scientific and Industrial Research, India

UGC-CSIR Junior Research Fellowship (**all India Rank 154**) *2017-2019*

GATE- Mathematics (**all India Rank 217**) *2017*
GATE- Graduate Aptitude Test in Engineering

INSPIRE Scholarship *2012-2017*
INSPIRE - Innovation in Science Pursuit for Inspired Research

Dr. A. P. J. Abdul Kalam Gold Medal for Best Academic Performance in MSc *2017*
Dr. A. P. J. Abdul Kalam-Former President of India

PUBLICATIONS

1. Pattar, R. R. and Uday Kiran, N. (2021), *Global well-posedness of a class of strictly hyperbolic cauchy problems with coefficients non-absolutely continuous in time.* **Bulletin des Sciences Mathématiques**, 171, 103037. **Link to the article**
2. Pattar, R. R. and Uday Kiran, N. (2021), *Strictly Hyperbolic Cauchy Problems on $\mathbb{R}^n$ with Unbounded and Singular Coefficients.* **Annali dell' Università di Ferrara**. **Link to the article**
3. Pattar, R. R. and Uday Kiran, N. (2021), *Energy Estimates and Global Well-posedness for a Broad Class of Strictly Hyperbolic Cauchy Problems with Coefficients Singular in Time*, **Journal of Pseudo-Differential Operators and Applications**,13,9. **Link to the article**
4. Pattar, R. R. and Uday Kiran, N. (2022), Global well-posedness of a class of singular hyperbolic Cauchy problems, **Monatshefte für Mathematik**. **Link to the article**

COMMUNICATED ARTICLES

4. Pattar, R. R. and Uday Kiran, N. (2021), Strictly hyperbolic equations with coefficients sublogarithmic in time. arXiv:2111.11701

MANUSCRIPTS UNDER PREPARATION

6. Pattar, R. R. and Uday Kiran, N. (2021), Loss of regularity well-posedness for a class of quasilinear singular hyperbolic Cauchy problems.

CONTRIBUTED OR INVITED TALKS

1. April, 2022: **Analysis and PDE group seminar, Ghent University**, Belgium (Global Well-posedness and Regularity Issues Associated with Singular Hyperbolic Cauchy Problems)
2. Delivered a series of 3 talks on "Loss Operator Associated to a Class of Strictly Hyperbolic Cauchy Problems" in Inverse Problems Learning Seminar, **Tata Institute of Fundamental Research** (TIFR), Centre for Applicable Mathematics, on 16^{th} and 23^{rd} of Aug. and 6^{th} Sept. 2021.
3. Aug. 31 - Sep. 4, 2020: **International Conference on Generalized Functions, Ghent**, Belgium (Global Well-posedness of a Class of Strictly Hyperbolic Cauchy Problems with Coefficients Non-Absolutely Continuous in Time)
4. Jan. 30, 2021: **SSSIHL** (Hyperbolic Operators: Global, Irregular and Degenerate Cases)
5. Feb. 29, 2020: **SSSIHL** (A Generalized Global Levi Condition for Weakly Hyperbolic Cauchy Problems with Coefficients Low-regular in Time)

CONFERENCES/WORKSHOPS ATTENDED

Workshop on Inverse Problems and Related Topics (Online), 2021. Organized by: ICTS, Bangalore

Contact and Symplectic Geometry (NCMW 2018). Organized by: IISER, Bhopal, India.

Parabolic Partial Differential Equations and Applications to Image Processing (NW-PDEAIP 2015). Organized by: SSSIHL, Prasanthi Nilayam, India.

International Workshop on Differential Geometry - Foundations and Developments (IWDiffGeo 2015). Organized by: SSSIHL, Prasanthi Nilayam, India.

TEACHING ASSISTANCE

Functional Analysis(Graduate Course)	Spring 2019
Linear Algebra, (Under graduate Course)	Fall 2018
Measure Theory(Graduate Course)	Spring2018

MINI PROJECTS

I am interested in computer programming as well. The following mini projects demonstrate this:

1. Programmed a shell using C language in Linux platform (2015)
2. Implimenting PDEs using Finite Difference Schemes in Python (2016)
3. Implimenting PDEs using Finite Element Methods in Matlab (2017)

GRADUATE COURSEWORK

Mathematics

- ❑ Microlocal Analysis
- ❑ Functional Analysis
- ❑ Differential Geometry
- ❑ Symplectic Geometry
- ❑ Topology
- ❑ Real and Complex Analysis
- ❑ Linear Algebra
- ❑ Global Pseudodifferential Calculus
- ❑ Distributions and Linear PDEs
- ❑ Theory of Partial Differential Equations
- ❑ Theory Ordinary Differential Equations
- ❑ Spectral Theory for Linear Operators
- ❑ Finite Element Methods for PDEs
- ❑ Finite Difference Methods for PDEs
- ❑ Algebra - Groups, Rings, Fields

Computer Science

- ❑ Python
- ❑ C++
- ❑ C
- ❑ Matlab
- ❑ Data Mining
- ❑ Computer Architecture
- ❑ Algorithm Design

PERSONAL SKILLS

Languages:	English(Fluent), Kannada(Native)
Others:	Latex, Sketching, Shuttle Badminton

EXTRA-CURRICULAR

- ❑ Organizer for Department Math Club: I was one of the organizer for the department math club-Math Enthusiasts. I have organized the talks and also have given a talk on "Uncertainty Principle".
- ❑ Mathematics Education Activities: Demonstrating Pythagoras theorem using Geoboard and tangram to school students.
- ❑ Mentor for undergraduate students(2018–2020): I have actively participated in the mentorship program of the hostel. In the two years, I have mentored 25 undergraduate students in the hostel.
- ❑ Sri Sathya Sai Hostel Services
  - Incharge of Water Supply Team (2017–2021): The team takes care of water supply and plumbing related issues of the hostel
  - Member of RO Water Supply Team (2015–2017): The team takes care of quality assurance of the drinking water needs of the hostel
  - Member of Audiovisual Centre (2012–2015): The centre takes care of the audiovisual needs (sound mixing, mike and speaker arrangements) of various events organised at the hostel

REFERENCES

1. **Dr. N Uday Kiran**, Associate Professor, Department of Mathematics and Computer Science, Sri Sathya Sai Institute of Higher Learning, Prasanthi Nilayam, `nudaykiran@sssihl.edu.in`
2. **Prof. Ramesh Sharma** Department of Mathematics and Physics, University of New Haven, Connecticut, `RSharma@newhaven.edu`
3. **Prof. Raghavendra V.** Retired, Department of Mathematics and Statistics, Indian Institute of Technology, Kanpur, `vrag@iitk.ac.in`