

ADVANCES IN PDE AND HARMONIC ANALYSIS
A CONFERENCE IN HONOUR OF JORGE HOUNIE

Program and book of abstracts

For up-to-date info, check:

<https://www.dm.ufscar.br/eventos/apdeha2023/>

January 9 – 11, 2023
São Carlos, SP, Brazil



DM / UFSCar

Advances in PDE and Harmonic Analysis

*A conference in honour of **Jorge Hounie**
on the occasion of his 75th birthday*

January 09 - 11, 2023

Scientific Committee

Shiferaw Berhanu
Paulo Cordaro
Paulo Dattori da Silva
Gustavo Hoepfner
Tiago Picon

Organizing Committee

Gabriel Araújo
Camilo Campana
Renata Oliveira Figueira
Alexandra Menis
Luciele Rodrigues Nunes
Giuliano Angelo Zugliani

For further information:
[https://www.dm.ufscar.br
/eventos/apdeha2023/](https://www.dm.ufscar.br/eventos/apdeha2023/)



Sponsors



Speakers

- Josefina Álvarez – New Mexico State University, USA
- Shiferaw Berhanu – University of Maryland, USA
- Paulo Cordaro – University of São Paulo, Brazil
- Galia Dafni – Concordia University, Canada
- Gustavo Hoepfner – Federal University of São Carlos, Brazil
- Ilya Kossovskiy – Masaryk University, Czech Republic
- Nicolas Lerner – Sorbonne Université, France
- Gerardo Mendoza – Temple University, USA
- Mario Milman – Instituto Argentino de Matemática, Argentina
- Tiago Picon – University of São Paulo, Brazil
- Evandro Raimundo da Silva – University of São Paulo, Brazil
- François Treves – Rutgers University, USA
- Giuliano Zugliani – State University of Campinas, Brazil

Organization

Scientific committee

- Shiferaw Berhanu – University of Maryland, USA
- Paulo Cordaro – University of São Paulo, Brazil
- Paulo Dattori da Silva – University of São Paulo, Brazil
- Gustavo Hoepfner – Federal University of São Carlos, Brazil
- Tiago Picon – University of São Paulo, Brazil

Organizing committee

- Gabriel Araújo – University of São Paulo, Brazil
- Camilo Campana – University of São Paulo, Brazil
- Renata Oliveira Figueira – State University of Campinas, Brazil
- Alexandra Menis – Federal Technological University of Paraná, Brazil
- Luciele Rodrigues Nunes – Federal University of Rio Grande, Brazil
- Giuliano Zugliani – State University of Campinas, Brazil

Talks

Josefina Álvarez

TITLE: THE DIRICHLET KERNEL IS NOT GOOD

Abstract: Indeed, in Shakarchi's and Stein's terminology, the Dirichlet kernel is not good. How bad it is, will be the theme of this talk, where I will prove several results, some well known and some, hopefully, not so well known, about its badness.

Shif Berhanu

TITLE: REMARKS ON SOME OF JORGE HOUNIE'S WORKS

Abstract: In this talk we will present a summary of some of Jorge Hounie's research achievements with a particular focus on his joint works with Joaquim Tavares and the speaker.

Paulo D. Cordaro

TITLE: SOME CONTRIBUTIONS OF J. HOUNIE ON THE PROBLEMS OF SOLVABILITY HYPOELLIPTICITY OF LINEAR PDE AND SYSTEMS

Abstract: In this talk I will present some of Hounie's results in the questions of existence and regularity of solutions to linear PDE and systems. The goal is to emphasize his contributions obtained in a remarkable academic career.

Galia Dafni

TITLE: THE BOUNDEDNESS OF INHOMOGENEOUS CALDERÓN–ZYGMUND OPERATORS ON LOCAL HARDY SPACES AND APPROXIMATE MOMENT CONDITIONS

Abstract: In joint work with Chun Ho Lau (Concordia), Tiago Picon (Universidade São Paulo), and Claudio Vasconcelos (Universidade Federal de São Carlos), we show the boundedness of inhomogeneous Calderón–Zygmund operators on the local Hardy spaces h^p , $0 < p \leq 1$, under certain logarithmic Campanato-type cancellation conditions on the

operator. The proof is based on a new atomic and molecular decomposition using these approximate moment conditions. We also show that these conditions are necessary.

Gustavo Hoepfner

TITLE: HARDY SPACES, FROM CLASSICAL TO MODERN

Abstract: In this talk I will discuss some works in which the contributions of Professor Jorge Hounie were essential, starting with my own PhD thesis to the co-supervision of an ongoing graduate research in University of Arkansas.

Ilya Kossovskiy

TITLE: SPHERICITY AND ANALYTICITY OF A STRICTLY PSEUDOCONVEX HYPERSURFACE IN LOW REGULARITY

Abstract: It is well known that the sphericity of a strictly pseudoconvex real hypersurface amounts to the vanishing of its Chern-Moser tensor. The latter is computed pointwise in terms of the 6-jet of the hypersurface at a point, and thus requires regularity of the hypersurface of class at least C^6 . In our joint work with Zaitsev, we apply our recent theorem on the analytic regularizability of a strictly pseudoconvex hypersurface to find a necessary and sufficient condition for the sphericity of a strictly pseudoconvex hypersurfaces of arbitrary regularity starting with C^3 . Further, we obtain a simple condition for the analytic regularizability of hypersurfaces of the respective classes. Surprisingly, despite of the seemingly analytic nature of the problem, our technique is geometric and is based on the Reflection Principle in SCV.

Nicholas Lerner

TITLE: INTEGRATING THE WIGNER DISTRIBUTION ON SUBSETS OF THE PHASE SPACE

Abstract: We shall review several properties of integrals of the Wigner distribution on subsets of the phase space, stressing the link between Signal Theory and Quantum Mechanics; in particular we shall use the Weyl quantization to formulate various questions related to the Wigner distribution. We will provide a theoretical proof of the invalidity of Flandrin's conjecture about integrals of the Wigner distribution on convex subsets of the phase space, a fact already proven via numerical arguments in our joint paper [\[MR4054880\]](#) with B. Delourme and T. Duyckaerts. We shall review the case of subsets of the plane whose boundary is a conic curve and show that Mehler's formula can be helpful in the analysis of these cases, including for the higher dimensional case investigated in the paper [\[MR2761287\]](#) by E. Lieb and Y. Ostrover.