

# Chadi Saba

## Curriculum Vitae

Bordeaux Mathematics Institute  
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### Personal Information

Date of birth August 16, 1997.  
Place of birth Zgharta, Lebanon.  
Nationality Lebanese.

### Present Position

Since Sep. 2024 **Temporary Teaching and Research Assistant (ATER)**, University of Bordeaux, France.

### Education

- 2021- 2024 **PhD in Mathematics**, The Littlewood problem and non-harmonic Fourier series, University of Bordeaux, France.  
supervisors: [Karim Kellay](#) & [Philippe Jaming](#).
- 2019 - 2021 **Master's degree in Mathematics**, University of Angers, France.  
Internship: Linearized wave-damping structure of Vlasov-Poisson in  $\mathbb{R}^3$ .  
supervisor: [Frédéric Hérau](#).
- 2016 - 2019 **Bachelor's degree in Mathematics**, Lebanese University, Lebanon.

### Research Interest

Complex analysis  
Non-harmonic Fourier series  
Ingham type inequalities

## Publications And Preprints

Sep. 2024 **On  $L^1$ -norms for non-harmonic trigonometric polynomials with sparse frequencies**, submitted.

Preprint on [arXiv:2409.07093v1](https://arxiv.org/abs/2409.07093v1) [[math.CA](#)].

**Abstract:** In this paper we show that, if an increasing sequence  $\Lambda = (\lambda_k)_{k \in \mathbb{Z}}$  has gaps going to infinity  $\lambda_{k+1} - \lambda_k \rightarrow +\infty$  when  $k \rightarrow \pm\infty$ , then for every  $T > 0$  and every sequence  $(a_k)_{k \in \mathbb{Z}}$  and every  $N \geq 1$ ,

$$A \sum_{k=0}^N \frac{|a_k|}{1+k} \leq \frac{1}{T} \int_{-T/2}^{T/2} \left| \sum_{k=0}^N a_k e^{2i\pi\lambda_k t} \right| dt,$$

further, if  $\sum_{k \in \mathbb{Z}} \frac{1}{1+|\lambda_k|} < +\infty$ ,

$$B \max_{|k| \leq N} |a_k| \leq \frac{1}{T} \int_{-T/2}^{T/2} \left| \sum_{k=-N}^N a_k e^{2i\pi\lambda_k t} \right| dt,$$

where  $A, B$  are constants that depend on  $T$  and  $\Lambda$  only. The results are then applied to observability of Schrödinger equations with moving sensors.

Jun. 2024 **From Ingham's to Nazarov's inequality: a survey on some trigonometric inequalities**, Advances in Pure and Applied Mathematics.

Published version available on [ISTE OpenScience](#).

Preprint on [arXiv:2311.17714v1](https://arxiv.org/abs/2311.17714v1) [[math.CA](#)].

**Abstract:** The aim of this paper is to give an overview of some inequalities about  $L^p$ -norms ( $p = 1$  or  $p = 2$ ) of harmonic (periodic) and non-harmonic trigonometric polynomials. Among the material covered, we mention Ingham's Inequality about  $L^2$ -norms of non-harmonic trigonometric polynomials, the proof of the Littlewood conjecture by Mc Gehee, Pigno and Smith on the lower bound of the  $L^1$ -norm of harmonic trigonometric polynomials as well as its counterpart in the non-harmonic case due to Nazarov. For the latter one, we give a quantitative estimate that completes our recent result with an estimate of  $L^1$ -norms over small intervals. We also give some stronger lower bounds when the frequencies satisfy some more restrictive conditions (lacunary Fourier series, multi-step arithmetic sequences)

Aug. 2023 **The Littlewood problem and non-harmonic Fourier series**, Mathematische Annalen.

Published version available on [SpringerLink](#).

Preprint on [arXiv:2311.17714](https://arxiv.org/abs/2311.17714) [[math.CA](#)].

**Abstract:** In this paper, we give a quantitative estimate of  $L^1$ -norms of non-harmonic (non-periodic) trigonometric polynomials over large enough intervals. Our result extends previous results from harmonic (periodic) to non-harmonic setting.

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## Teaching Experience

Since Sep 24 **University of Bordeaux, Science and technology department, Bordeaux, France.**

- **Mathematical Tools:** L1 tutorials (56h).  
spatial geometry, limits, derivative, circular, exponential, and logarithmic functions, scalar product, integrals, differential equations.
- **General Math:** L1 lectures and tutorials (66h).  
Fundamentals of logic, set theory, complex numbers, limits, continuity and derivatives of functions, integrals, differential equations

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## Conferences and Workshops

- Jun. 2024 [Margaux PhD days 24](#), Pau, France.
- Apr. 2024 [Harmonic analysis, Operator and function theory, and their applications](#), Bordeaux, France
- Oct. 2023 [Enlight Days](#), Bordeaux, France
- Jul. 2023 [Summer School on unique continuation and applications](#), Castro Urdiales, Spain.
- Jan. 2023 Meeting of the ANR RAGE Project (Real Analysis And Geometry), Bordeaux, France
- May 2023 [Margaux Phd Days 23](#), Poitier, France ([Slides](#))
- Oct. 2022 [Les Journées du GDR AFHP](#), Corte, France ([Slides](#))
- May 2022 [Margaux Phd Days 22](#), Bordeaux, France
- Jun. 2021 [From Kinetic Equations To Statistical Mechanics](#), Saint-Jean-De-Monts, France

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## Posters

- Mar. 2023 Mathematics and computer science doctoral school day ([Poster](#))

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## Languages

- Arabic Mother Tongue
- French Fluent
- English Fluent

## Computer Skills

- LaTeX
- GeoGebra
- Excel
- Word
- PowerPoint

## Hobbies

Reading  
Tennis

## Last Update

October 2024