# Hao-Ning Wu

#### **Affiliation**

Department of Mathematics The University of Hong Kong Hong Kong SAR

#### **Contact Information**

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#### Research Interests

- □ Analysis, partial differential equations (PDEs) and integral equations, and their numerical analysis. □ Approximation theory, applied harmonic analysis, and their applications to mathematical data science.
- **Specific Topics** include multivariate approximation, orthogonal polynomials, high-dimensional numerical integration, spectral methods for PDEs, boundary integral methods, and compressed sensing/imaging

#### Education

- □ Ph.D. in Mathematics, The University of Hong Kong, China: Dec 2023 (to be conferred)
  Thesis title: Restricted isometry and information-based numerical analysis
  Advisor: Prof. X. Yuan
- □ B.Sc. in Mathematics, Jinan University, Guangzhou, China: Jun 2019

## **Experience**

□ Postdoctoral Fellow: Sept 2023 –
Department of Mathematics, The University of Hong Kong, China (Mentor: Prof. D. LI)

## Visiting

☐ The University of Sydney, Australia, hosted by Prof. D.-X. Zhou: Jan 9 – 27, 2023

#### **Honors and Awards**

- 2019 Doris Chen Postgraduate Scholarship: Dept of Mathematics, The University of Hong Kong

  To attract top quality research postgraduate students to the department
- 2019 Bachelor's Thesis Award: Jinan Undergraduate School
- 2018 National Scholarship: Ministry of Education of the People's Republic of China
- 2017 Elite Undergraduate Training Program (2017 19): Jinan Undergraduate School

To offer major-related complementary research training to top students (<1% each cohort)

#### A RESEARCH AND RELATED ACTIVITIES

#### **Research Publications**

The authorship order of all my coauthored works is alphabetical. Clickable entries to database profiles: MathSciNet, zbMATH, Google Scholar, and ResearchGate.

#### Journal Articles

- 6. Bypassing the quadrature exactness assumption of hyperinterpolation on the sphere, with C. An *J. Complexity*, 101789, to appear.
- Enhanced total variation minimization for stable image reconstruction, with C. An and X. Yuan Inverse Problems, 39 (2023), 075005
- 4. On the quadrature exactness in hyperinterpolation, with C. An *BIT Numer. Math.*, 62 (2022), 1899–1919

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- 3. The springback penalty for robust signal recovery, with C. An and X. Yuan *Appl. Comput. Harmon. Anal.*, 61 (2022), 319–346
- 2. Lasso hyperinterpolation over general regions, with C. An SIAM J. Sci. Comput., 43 (2021), A3967–A3991
- Tikhonov regularization for polynomial approximation problems in Gauss quadrature points, with C. An Inverse Problems, 37 (2021), 015008

#### **Preprints**

- 2. Breaking quadrature exactness: A spectral method for the Allen–Cahn equation on spheres, with X. Yuan arXiv: 2305.04820
- Is hyperinterpolation efficient in the approximation of singular and oscillatory functions?, with C. An arXiv: 2205.08218

## **Presentations**

## **Conferences and Workshops**

• 15-min contributed talk, The 7th Workshop on Recent Advances on Spectral Methods and Related Applications, Beijing Computational Science Research Center, China, Jun 8 – 9, 2019

## **Seminars and Colloquiums**

- Postgraduate Student Seminar (thesis defense), Dept of Mathematics, The University of Hong Kong, China, Jun 26, 2023
- Qualifying Research Seminar, Dept of Mathematics, The University of Hong Kong, China, Jan 21, 2021

# **Grants and Travel Support**

#### **Internal Funding Schemes**

- Travel Support for Research Postgraduate Students 2022/23 (Sept Round) HKU University Research Committee: 13,500 HKD, Jan 1 28, 2023
- National Undergraduate Innovation Research Grant 201710559017 Research on barycentric interpolation: Algorithm and application

JNU Undergraduate School: 20,000 CNY, Aug 1, 2017 - Jul 31, 2018

TEACHING AND RELATED ACTIVITIES

# **Classroom Teaching Duties**

## **Teaching Assistant Duties**

**Certificate:** Certificate of Teaching and Learning in Higher Education (Nov 2019), issued by HKU Centre for the Enhancement of Teaching and Learning (CETL) upon completion of eight 3-hour modules about the principles of learning, teaching, assessment and feedback in a university context.

**Responsibilities:** Offering weekly tutorials; preparing and grading assignments; holding office hours; and invigilating tests and exams

Spring 2023	MATH1013	University Mathematics II (HKU <sup>1</sup> )
Fall 2022	MATH3901	Operations Research I (HKU)
Spring 2022	MATH1013	University Mathematics II (HKU)
Fall 2021	MATH3901	Operations Research I (HKU)
Spring 2021	MATH1009	Basic Mathematics for Business and Economics (HKU)
Fall 2020	MATH2101	Linear Algebra I (HKU)
Spring 2020	MATH1009	Basic Mathematics for Business and Economics (HKU)
Fall 2018	07010167	Numerical Linear Algebra (JNU <sup>2</sup> )

 $<sup>^1\</sup>mathrm{Semesters}$  at the University of Hong Kong: Fall (Sept – Dec) and Spring (Jan – May)

<sup>&</sup>lt;sup>2</sup>Semesters at Jinan University: Fall (Sept – Jan) and Spring (Feb – Jul)

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# SERVICE AND RELATED ACTIVITIES

TIME FORMAT: MM/YY

## **Academic Service**

#### Referee for Journals

- Advances in Computational Mathematics (05/23)
- $\bullet$  Numerical Algorithms (08/22)

#### Misc

- Referee: S.T. Yau High School Science Award (Asia) (09/22, 09/21)
- Conference Assistant: Conference on Advances in Nonsmooth Analysis and Applications, Southern University of Science and Technology, Shenzhen, China (12/19)

## Membership of Learned Societies

- CMS Chinese Mathematical Society (since Aug 2023)
- CSCM Chinese Society for Computational Mathematics (since Aug 2023)
- HKSIAM Hong Kong Society for Industrial and Applied Mathematics (since Mar 2023)
- SIAM Society for Industrial and Applied Mathematics (since Jul 2022)

Hong Kong · August 26, 2023.