Taiyang XU

Room 2101, Guanghua East Main Tower, Fudan University
220 Handan Rd, Shanghai
tyxu19@fudan.edu.cn
https://taiyangyxu.github.io

Education

Fudan University Shanghai, China

Ph.D. student 2019 - Present
Thesis: *TBA*
Academic advisor: *Engui Fan and Lun Zhang*

China University of Mining and Technology Xuzhou, Jiangsu Province, China
B.Sc. in Mathematics, Distinguished Honor 2015 - 2019
Thesis: *Inverse scattering theory and integrability on several kinds of nonlinear evolution equations*
Thesis advisor: *Shoufu Tian*

Research Interests

Integrable PDEs, Random matrices theory, Determinantal point processes, Orthogonal polynomials, Asymptotic analysis, Riemann-Hilbert (RH) problems, Special functions, Painlevé equations.

Research Articles

Preprints

[7] Transient asymptotics of the modified Camassa-Holm equation (with Yiling Yang and Lun Zhang)
arXiv:2308.06950, submitted.

[6] Painlevé transcendents in the defocusing mKdV equation with non-zero boundary conditions (with Zhaoyu Wang and Engui Fan)
arXiv:2306.07073, submitted.

[5] On the large-time asymptotics of the defocusing mKdV equation with step-like initial data (with Engui Fan)
arXiv:2204.01299, submitted.

[4] Soliton resolution and asymptotic stability of N-soliton solutions for the defocusing mKdV equation with finite density type initial data (with Engui Fan and Zechuan Zhang)
arXiv:2108.03650, submitted.

Publications in refereed journals

[3] On the Cauchy problem of defocusing mKdV equation with finite density initial data: long-time asymptotics in soliton-less regions (with Engui Fan and Zechuan Zhang)

Journal of Differential Equations, 372 (2023), 55-122.

[2] Large-time asymptotics to the focusing nonlocal modified Kortweg-de Vries equation with step-like boundary conditions (with Engui Fan)
Studies in Applied Mathematics, 150 (2023), 1217-1273.

[1] Riemann-Hilbert approach for multisoliton solutions of generalized coupled fourth-order nonlinear Schrödinger equations (with Weiqi Peng and Shoufu Tian)
Mathematical Methods in the Applied Sciences, 43 (2020), 865-880.

Scholarships and Awards

Doctorate

– Huatai Securities Technology Scholarship, 2023.

– Scholarship by Pacific Insurance Company, 2022.

– Outstanding Doctoral Candidate Scholarship of Fudan University, 2021.

– Doctoral Outstanding Academic Year Scholarship of Fudan University, 2019-2023.

Undergraduate

– Outstanding Undergraduates in China University of Mining and Technology, 2015-2019.

Teaching Activities

– Fall, 2021: TA of Calculus A (MATH120021.02), Fudan University.

– Spring, 2020: TA of Calculus B (MATH120004.01), Fudan University (Online).

– Fall, 2019: TA of Calculus B (MATH120003.01), Fudan University.

Seminars

2022/2023

– Graduate student seminar of IS in FDU (Oct, 2022): *Painlevé type asymptotics for the Camassa-Holm equation.*

– Graduate student seminar of RMT in FDU (Sept - Oct, 2022): *A Riemann-Hilbert approach to Fredholm determinants of Hankel composition operators: scalar-valued kernels.*

– Graduate student seminar of IS in FDU (Sept, 2022): *Primitive potentials and bounded solutions of the KdV equation*, Fudan University.

2021/2022

– Graduate student seminar of IS in FDU (May - June, 2022): *Soliton V. The gas: Fredholm determinants, analysis and the rapid oscillations behind the kinetic equation.*

– Graduate student seminar of RMT in FDU (Dec, 2021 and Mar, 2022): *Airy kernel determinant solutions to the KdV equation and integro-differential Painlevé equations.*

– Graduate student seminar of IS in FDU (Oct, 2021): *The defocusing nonlinear Schrödinger equation with step-like oscillatory initial data.*

– Graduate student seminar of RMT in FDU (Oct, 2021): *Momenta spacing distributions in anharmonic and the higher order finite temperature Airy kernel.*

2020/2021

– Graduate student seminar of IS in FDU (April, 2021): *Long-Time behavior of the non-focusing nonlinear Schrödinger equation – a case study.*

– Graduate student seminar of RMT in FDU (Nov, 2020 and Mar, 2021): *On the origins of Riemann-Hilbert problems in mathematics.*

Conferences

2023/2024

– The 15th Hemudu Forum on Integrable Systems, Ningbo University, Ningbo, China, 24–26 Nov, 2023. **Talk**: *"Integrable PDEs with nonzero (symmetric and asymmetric) boundary conditions: large-time and transient asymptotics"*

– Fudan – NYU Shanghai Probability Day, Fudan University, Shanghai, 4th November, 2023.

2022/2023

– Foundations of Computational Mathematics 2023 (FoCM2023), Sorbonne Université, Paris, France, 12–21 June, 2023.

2021/2022

– Random Matrix EurAsia 2022, Institute for Mathematical Sciences (IMS), National University of Singapore, Singapore, 18 April - 13 May, 2022. (Online)

– The 13rd Hemudu Forum on Integrable Systems, Ningbo University, Ningbo, China, 15 - 17 Oct, 2021.