ZHAO YANG

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Zhongguancun East Road No.55, Haidian, Beijing China

EMPLOYMENT

Academy of Mathematics and Systems Science CAS, China *08/2022-current*

– associate professor

University of Illinois Urbana-Champaign, USA *08/2019-08/2022*

– J.L Doob research assistant professor
Mentors: Professors Vera Hur and Jared Bronski

EDUCATION

Indiana University, Bloomington, USA

– Doctor of Philosophy, Mathematics *08/2013-05/2019*
Advisor: Prof. Kevin Zumbrun
Thesis: Traveling waves in an inclined channel and their stability
College of Arts and Sciences Dissertation Research Fellowship (*2018-2019*)

– Master of Science, Applied Statistics *08/2016-05/2018*

Fudan University, Shanghai, China *09/2009-06/2013*

– Bachelor of Science, Mathematics and Applied Mathematics

INTERESTS

Nonlinear Partial Differential Equations:

– traveling waves and their stability; application to fluid dynamics, combustion, and detonation.

– hyperbolic system of balance laws; free surface water wave equations.

– rigorous analysis; analytical and numerical verification of stability conditions; numerical simulations of wave phenomena; computer-assisted proof.

– software: Matlab, Clawpack, Python; parallel computing; batch jobs.

PUBLICATIONS

1. M. Johnson, P. Noble, L. M. Rodrigues, **Z. Yang**, and K. Zumbrun, *Spectral stability of inviscid roll-waves*, **Comm. Math. Phys.**, 367, 265-316 (2019). Link

2. **Z. Yang** and K. Zumbrun, *Convergence as period goes to infinity of spectra of periodic traveling waves toward essential spectra of a homoclinic limit*, **J. Math. Pures Appl.**, 132, 27-40, (2019). Link

3. **Z. Yang** and K. Zumbrun, *Stability of hydraulic shock profiles*, **Arch. Ration. Mech. Anal.**, 235, 195-285 (2020). Link

4. A. Sukhtayev, **Z. Yang**, and K. Zumbrun, *Spectral stabilty of hydraulic shock profiles*, **Phys. D**, 405, 132360 (2020). Link

5. S. Jung, **Z. Yang**, and K. Zumbrun, *Stability of strong detonation waves for Majda's model with general ignition functions*, **Quart. Appl. Math.**, 79, 357-365, (2021). Link

6. L. M. Rodrigues, **Z. Yang** and K. Zumbrun, *Convective-wave solutions of the Richard-Gavrilyuk model for inclined shallow water flow*, **Water Waves** (2023).Link

7. V. Hur and **Z. Yang**, *Unstable Stokes waves*, **Arch. Ration. Mech. Anal.**, 247, 62 (2023). Link

8. **Z. Yang**, *An alternative proof of modulation instability of Stokes waves in deep water*, preprint, arXiv:2109.12101. Link

9. B. Braker, J. Bronski, V. Hur, and **Z. Yang**, *Asymptotic stability of sharp fronts. I One bound state implies stability*, preprint, arXiv:2112.04700. Link

10. G. Faye, L. M. Rodrigues, **Z. Yang**, and K. Zumbrun, Existence and stability of nonmonotone hydraulic shocks for the Saint Venant equations of inclined thin-film flow, preprint, arXiv: 2307.10657. Link

11. **Z. Yang** and K. Zumbrun, Multidimensional stability and transverse bifurcation of hydraulic shocks and roll waves in open channel flow, arXiv: 2309.08870. Link

12. V. Hur and **Z. Yang**, Unstable capillary-gravity waves, arXiv: 2311.01368. Link

CURRENT WORK

1. Z. Yang and K. Zumbrun, Phase-asymptotic stability of Lax or undercompressive viscous shock waves under $L^1 \cap H^4$ perturbations.

2. Z. Yang and K. Zumbrun, Numerical Evans function methods for computation of stability boundaries for periodic coefficient control.

3. L. M. Rodrigues, Z. Yang, and K. Zumbrun, Spectral stability of the Richard-Gavrilyuk roll-waves.

4. L. M. Rodrigues, Z. Yang, and K. Zumbrun, Existence and Stability of hydraulic shock profiles of Richard-Gavrilyuk Model.

5. D. Marchesin, A. Mailybaev, Z. Yang, and K. Zumbrun, Stability of degenerate traveling waves of 2×2 balance system.

6. T-Y. Xiao, V. Hur, and Z. Yang, Unstable Stokes waves with constant vorticity.

AWARDS AND PRIZES

Oct. 2021	Bhatnagar Award for Outstanding Thesis in Applied Mathematics
April 2019	Outstanding Thesis Award
2018-2019	College of Arts and Sciences Dissertation Research Fellowship
2018, Summer	Hazel King Thompson Summer Reading Fellowship
2018, Spring	Spring Semester Research Assistantship
2017, Summer	Hazel King Thompson Summer Reading Fellowship
April 2017	Schober Travel Award
April 2017	Graduate Student Travel Award
2013-2018	Full support for Math Phd program
2010-2012	People's Scholarship
2011, 2012	Major Scholarship
Dec. 2010	National College Students' Physical Competition **1st Prize**
2010, 2011	Selected in Top-notch Talent Plan of China
Sept. 2008	Chinese Physics Olympiad (CPhO) **1st Prize**
Dec. 2005	National Olympiad in Informatics in Provinces (NOIP) **1st Prize**

INVITED TALKS

May 12-15, 2023	The 10th Youth Academic Forum on PDEs, Xi'an
Nov. 17-20, 2022	CSIAM2022, Guangzhou (online)
Oct. 26-28, 2022	The Eighth Japan-China workshop, Beijing (online)
Mar. 29-Apr. 1 2022	Waves2022, Athens
Jan. 13, 2022	PDE seminar, BYU (online)
Oct. 9-10, 2021	AMS sectional meeting, Omaha (online)
Feb. 12, 2021	PDE seminar, Brown (online)
Feb. 17, 2021	PDE seminar, IU
Nov. 30, 2020	PDE seminar, IU
Apr. 22, 2019	PDE seminar, IU
Jan. 29, 2019	HADES seminar, UIUC
Oct. 29, 2018	PDE seminar, IU
Jul. 12, 2018	SIAM annual meeting, Portland

ACADEMIC VISITS

Jan. 26 - Mar. 07, 2018	Summer Program at IMPA, Rio de Janeiro, Brazil
Jun. 14 - Jul. 12, 2023	Short term visit, University of Rennes 1, France

TEACHING AND GRADING

2022, Spring	M444 *Elementary Real Analysis*, instructor
	M447 *Real Variables*, instructor
2021, Fall	M285 *Introduction to Differential Equations*, instructor
2021, Summer	M446 *Applied Complex Variables*, instructor
2021, Spring	M553 *Partial Differential Equations*, instructor
	M444 *Elementary Real Analysis*, instructor
2020, Fall	M558 *Methods of Applied Mathematics*, instructor
2020, Summer	M416 *Abstract Linear Algebra*, instructor
2020, Spring	M285 *Introduction to Differential Equations*, instructor (two sessions)
2019, Fall	M416 *Abstract Linear Algebra*, instructor
2017, Fall	M311 *Calculus III*, recitation
2017, Spring	M371 *Elementary Computational Method*, grading
	M540 *Partial Differential Equations I*, grading
2016, Fall	M413 *Introduction to Analysis I*, grading
	M471 *Numerical Analysis I*, grading
2016, Summer	M211 *Calculus I*, recitation
2016, Spring	M211 *Calculus I*, recitation (two sessions)
2015, Fall	M212 *Calculus II*, recitation (two sessions)
	M119 *Brief Survey of Calculus I*, instructor
2015, Summer	
2015, Spring	M211 *Calculus I*, recitation (two sessions)
2014, Fall	M413 *Introduction to Analysis I*, grading (two sessions)
2014, Spring	M415 *Elementary Complex Variables with Applications*, grading
	S343 *Honor Introduction to Differential Equation*, grading
2013, Fall	M303 *Linear Algebra for Undergraduates*, grading (two sessions)