

# CURRICULUM VITAE

## Professor Tong Yang

### Personal Particulars

Name: Tong Yang

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### Education

|                                                          |            |
|----------------------------------------------------------|------------|
| PhD in Mathematics, University of California, Davis, USA | June 1993  |
| MSc in Zhongshan University                              | July, 1990 |
| BSc in Zhongshan University                              | July, 1987 |

### Professional Career

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|---------------------------------------------------------------------|-------------------|
| • Chair Professor, The Hong Kong Polytechnic University             | 11/2022-present   |
| • Chair Professor of Mathematics, City University of Hong Kong      | 09/2007 – 11/2022 |
| • Professor, City University of Hong Kong                           | 07/2002 - 08/2007 |
| • Associate Professor, City University of Hong Kong                 | 07/1999 - 06/2002 |
| • Assistant Professor/Lecturer, City University of Hong Kong        | 09/1994 - 06/1999 |
| • Postdoctoral Member, Institute for Advanced Study, Princeton, USA | 09/1993 - 08/1994 |

### Distinctions and Academic Awards

- Foreign member, Academia Europaea, 2022.
- Member, Hong Kong Academy of Sciences, 2021.
- Member, The World Academy of Sciences, 2021.
- American Mathematical Society Fellow, 2021.
- The Hong Kong Research Grants Council-Senior Research Fellow, 2020.
- Ministry of Education Higher Education Outstanding Scientific Research Output Award (Science and Technology), China (First Prize in Natural Science), 2019.
- Member, the European Academy of Sciences, 2018.
- State Natural Science Award (2nd class), China, 2012.
- Croucher Senior Research Fellowship, 2011.
- Changjiang Chair Professor, the Ministry of Education of China, 2005.
- National Science Fund for Distinguished Young Scholars, China, 2004 .
- Morningside Silver Medal of Mathematics, ICCM, 1998.

### Honors and Professional Positions

- Member at large, Hong Kong Mathematical Society (since June-2020)
- The President of the Hong Kong Mathematical Society (2016-2020)

- Honorary Professor of Guangxi University (2019-2024)
- Visiting Chair Professor of Shanghai Jiao Tong University, China (since 2013)
- Visiting Chair Professor of Jinan University, China (2015-18)
- Officer of Mathematics Division, European Academy of Sciences (2019-2022)
- Panel Member of the Physical Science Panel of Research Grants Council (RGC), HKSAR (2010-15; 2019-2022)
- Academic Committee Member of the Hong Kong Scholar Scheme (since 2011)

## Editorial Work

### Co-Editor-in-Chief

- Kinetic and Related Model, (2008-present)
- Communications in Mathematical Analysis and Applications, (2022-present)
- Analysis and Applications, (2013-2017)

### Editorial Board

- London Mathematical Society: Bulletin and Journal, (2020-present)
- SIAM Journal on Mathematical Analysis, (2021-present)
- Chinese Annals of Mathematics, Series B, (2022-present)
- Annals of Applied Mathematics, (2015-present)
- Journal of Mathematical Analysis and Applications, (2017-2021)

## Administration Posts

- Head of Department of Mathematics 08/2012 – 08/2018
- Associate Dean of College of Science and Engineering 09/2007 – 08/2011

## Grants as Principle investigator

- 27 GRF/CERG General Research Grant of Hong Kong/Competitive Earmark Research Grant of Hong Kong
- 1 NSFC/RGC NSFC/RGC Joint Research Scheme

## Selected Publications (from over 200 journal papers)

1. Renjun Duan, Shuangqian Liu and **Tong Yang**, The Boltzmann equation for plane Couette flow, to appear in Journal of the European Mathematical Society.
2. Renjun Duan, Ling-Bing He, **Tong Yang** and Yu-Long Zhou, Solutions to the non-cutoff Boltzmann equation in the grazing limit, to appear in Ann. Inst. H. Poincaré Anal Non Linéaire.
3. Chengjie Liu, **Tong Yang** and Zhu Zhang, Analysis of the Tollmien-Schlichting wave in the Prandtl-Hartmann regime, to appear in Journal de Mathématique Pures et Appliquées.
4. Renjun Duan, Shuangqian Liu and **Tong Yang**, Global classical solutions for the Vlasov-Nordstrom-Fokker-Planck system, to appear in SIAM Journal on Mathematical Analysis.
5. Hai-Liang Li, **Tong Yang** and Mingying Zhong, Spectrum analysis for the Vlasov-Poisson-Boltzmann system, to appear in Archive for Rational Mechanics and Analysis.
6. Wei-Xi Li and **Tong Yang**, Well-posedness of the MHD boundary layer system in Gevrey function space without structural assumption, to appear in SIAM Journal on Mathematical Analysis.

7. Jingwei Hu, Kunlun Qi and **Tong Yang**, A new stability and convergence proof of the Fourier-Galerkin spectral method for the spatially homogeneous Boltzmann equation, to appear in SIAM Journal on Numerical Analysis.
8. Wei-Xi Li, Nader Masmoudi and **Tong Yang**, Well-posedness in Gevrey function space for 3D Prandtl equations without structural assumption, Communications on Pure and Applied Mathematics (2021) doi.org/10.1002/cpa./21989.
9. Huanyao Wen, **Tong Yang**, Xinhua Zhao and Changjiang Zhu, Optimal convergence rate of the vanishing shear viscosity limit for compressible Navier-Stokes equations with cylindrical symmetry, to appear in Journal de Mathematique Pures et Appliquees. DOI 10.1016/j.matpur.2020.09.003.
10. Ricardo Alonso, Yoshinori Morimoto, Weiren Sun and **Tong Yang**, Non-cutoff Boltzmann equation with polynomial decay perturbation, Revista Matematica Iberoamericana, 37(2021), no. 1, 189-292.
11. Chengjie Liu, Dehua Wang, Feng Xie and **Tong Yang**, Magnetic effects on the solvability of 2D MHD boundary layer equations without resistivity in Sobolev spaces, Journal of Functional Analysis, 279 (2020) 108637.
12. Hailiang Li, **Tong Yang** and Mingying Zhong, Green's function and pointwise space-time behavior of the Vlasov-Poisson-Boltzmann equation, Archive for Rational Mechanics and Analysis, 235, 1011-1057 (2020).
13. Wei-xi Li and **Tong Yang**, Well-posedness in Gevrey function space for the Prandtl equations with non-degenerate critical points, Journal of European Mathematical Society, 22, 717-775 (2020).
14. Cheng-Jie Liu, Feng Xie and **Tong Yang**, Justification of Prandtl ansatz for MHD boundary layer, SIAM Journal on mathematical Analysis, 51(3), (2019), 2748-2791.
15. Hongjie Dong, **Tong Yang** and Mingying Zhong, Exterior problem of the linear Vlasov-Poisson-Boltzmann system, SIAM Journal on mathematical Analysis, 51(3), 1792-1823 (2019).
16. Chengjie Liu, Feng Xie and **Tong Yang**, MHD boundary layers in Sobolev spaces without monotonicity. I. Well-posedness theory, Communications on Pure and Applied Mathematics, vol. LXXII, 0063-0121 (2019).
17. Xie Feng and **Tong Yang**, Global-in-time stability of 2D MHD boundary layer in the Prandtl-Hartmann Regime, SIAM Journal on Mathematical Analysis, 50(6), 5749-5760 (2018).
18. **Tong Yang** and Hongjun Yu, Global solution for the spatially inhomogeneous non-cutoff Kac equation, SIAM Journal on Mathematical Analysis, vol. 50, no. 4, 4503-4562 (2018).
19. Hailiang Li, Yi Wang, **Tong Yang** and Mingying Zhong, Stability of nonlinear wave patterns to the bipolar Vlasov-Poisson-Boltzmann system, Archive for Rational Mechanics and Analysis, Vol. 228, no. 1, 39-127 (2018).
20. Chengjie Liu and **Tong Yang**, Ill-posedness of the Prandtl equations in Sobolev spaces around a shear flow with general decay, Journal de Mathematique Pures et Appliquees, 108 (2017), 150-162.
21. Renjun Duan, Feimin Huang, Yong Wang and **Tong Yang**, Global Well-posedness of the Boltzmann equation with large amplitude initial data, Archive for Rational Mechanics and Analysis, vol. 225, no. 1, 375-424 (2017).
22. Renjun Duan, Yuanjie Lei, **Tong Yang** and Huijiang Zhao, The Vlasov-Maxwell-Boltzmann system near Maxwellians in the whole space with very soft potentials, Communications in Mathematical Physics, vol. 351, no. 1, 95-153 (2017).
23. Chengjie Liu, Yaguang Wang and **Tong Yang**, A well-posedness theory for the Prandtl equations in three space variables, Advances in Mathematics, vol. 308, 1074-1126, (2017).
24. Yoshinori Morimoto, **Tong Yang** and Huijiang Zhao, *Convergence to self-similar solutions for the Homogeneous Boltzmann Equation*, Journal of European Mathematical Society, 19, no. 8, 2041-2067 (2017).

25. Yong-Kum Cho, Yoshinori Morimoto, Shuaikun Wang and **Tong Yang**, *Probability measures with finite moments and the homogeneous Boltzmann equation*, SIAM Journal on Mathematical Analysis, vol. 48, no. 4, 2399-2413 (2016).
26. **Tong Yang** and Hongjun Yu, *Spectrum analysis of some kinetic equations*, Archive for Rational Mechanics and Analysis, 222 (2016), 731-768.
27. Cheng-Jie Liu, Ya-Guang Wang and **Tong Yang**, *On the ill-posedness of the Prandtl equations in three-dimensional space*, Archive for Rational Mechanics and Analysis, Vol. 220, Issue 1, (2016), 83-108.
28. Hai-Liang Liu, **Tong Yang** and Mingying Zhong, *Spectrum structure and behaviors of the Vlasov-Maxwell-Boltzmann systems*, SIAM Journal on Mathematical Analysis, Vol. 48, Issue 1, (2016), 595-669.
29. Yaguang Wang, Feng Xie and **Tong Yang**, *Local well-posedness of Prandtl equations for compressible flow in two space variables*, SIAM Journal of Mathematical Analysis, 47(1), (2015), 321-346.
30. Xulong Qin, **Tong Yang**, Zheng-an Yao and Wenshu Zhou, *Vanishing shear viscosity and boundary layer for the Navier-Stokes equations with cylindrical symmetry*, Archive for Rational Mechanics and Analysis, 216 (2015), 1049-1086.
31. Yoshinori Morimoto, Shuaikun Wang and **Tong Yang**, *A New characterization and global regularity of infinite energy solutions to the homogeneous Boltzmann equation*, Journal de Mathematique Pures et Appliquees, 9 (103) (3), (2015), 809-829.
32. Radjesvarane Alexandre, Yaguang Wang, Chao-Jiang Xu and **Tong Yang**, *Well- posedness of The Prandtl Equation in Sobolev Spaces*, Journal of American Mathematical Society, 28(3), (2015), 745-784.
33. Yoshinori Morimoto and **Tong Yang**, *Smoothing effect of the homogeneous Boltzmann equation with measure valued initial datum*, Ann. Inst. H. Poincaré Anal Non Linéaire, 32 (2015), 429-442.
34. Hongxia Liu, **Tong Yang**, Huijiang Zhao and Qingyang Zou, *One-dimensional Compressible Navier-Stokes Equations with Temperature Dependent Transport Coefficients and Large Data*, SIAM Journal on Mathematical Analysis., 46(3), (2014), 2185-2228.
35. Feimin Huang, Yi Wang, Yong Wang and **Tong Yang**, *The Limit of the Boltzmann Equation to the Euler Equations for Riemann Problems*, SIAM Journal on Mathematical Analysis, 45(3), (2013), 1741-1811.
36. Zhong Tan, **Tong Yang**, Huijiang Zhao and Qingyang Zou, *Global Solutions to the One-dimensional Compressible Navier-Stokes-Poisson Equations with Large Data*, SIAM Journal on Mathematical Analysis, vol. 45, no. 2 (2013), 547-571.
37. Alberto Bressan, Feimin Huang, Yi Wang and **Tong Yang**, *On the convergence rate of vanishing viscosity approximations for nonlinear hyperbolic systems*, SIAM Journal on Mathematical Analysis, vol. 44, no. 5, 3537-3563, (2012).
38. Zhouping Xin, **Tong Yang** and Hongjun Yu, *The Boltzmann Equation with soft potentials near the Local Maxwellian*, Archive for Rational Mechanics and Analysis, 206 (2012), no. 1, 239-296.
39. Feimin Huang, Ming Mei, Yong Wang and **Tong Yang**, *Long-Time Behavior of Solutions to the Bipolar Hydrodynamic Model of Semiconductors with Boundary Effect*, SIAM Journal of Mathematical Analysis, vol. 44, no. 2, 1134-1164, (2012).
40. Radjesvarane Alexandre, Yoshinori Morimoto, Seiji Ukai, Chao-Jiang Xu and **Tong Yang**, *Boltzmann equation without angular cutoff in the whole space: I, Global existence for soft potential*, Journal of Functional Analysis, 262 (2012), 915-1010.
41. Feimin Huang, Yi Wang and **Tong Yang**, *Vanishing Viscosity Limit of the Compressible Navier-Stokes Equations for Solutions to Riemann Problem*, Archive for Rational Mechanics and Analysis, 203 (2012), no. 2, 379-413.

42. **Tong Yang** and Hongjun Yu, Global solutions to the relativistic Landau-Maxwell system in the whole space, *Journal de Mathematique Pures et Appliquees*, (9)97 (2012), no. 6, 602-634.
43. Radjesvarane Alexandre, Yoshinori Morimoto, Seiji Ukai, Chao-Jiang Xu and **Tong Yang**, The Boltzmann equation without angular cutoff in the whole space: Qualitative properties of solutions, *Archive for Rational Mechanics and Analysis*, 202 (2011) 599-661.
44. Radjesvarane Alexandre, Yoshinori Morimoto, Seiji Ukai, Chao-Jiang Xu and **Tong Yang**, Global existence and full regularity of the Boltzmann equation without angular cutoff, *Communications in Mathematical Physics*, 304, 513-581 (2011).
45. **Tong Yang** and Hongjun Yu, Optimal convergence rates of classical solutions for Vlasov-Poisson-Boltzmann System, *Communications in Mathematical Physics*, 301, 319-355 (2011).
46. Radjesvarane Alexandre, Yoshinori Morimoto, Seiji Ukai, Chao-Jiang Xu and **Tong Yang**, Regularizing effect and local existence for non-cutoff Boltzmann equation, *Archive for Rational Mechanics and Analysis*, Vol. 198 (2010), No. 1, 39-123.
47. **Tong Yang** and Hongjun Yu, Global classical solutions for Vlasov-Maxwell-Fokker-Planck system, *SIAM Journal of Mathematical Analysis*, 42 (2010), no. 1, 459-488.
48. Renjun Duan and **Tong Yang**, Stability of the one-species Vlasov-Poisson- Boltzmann system, *SIAM Journal of Mathematical Analysis*, Vol. 41, no. 6 (2010), 2353-2387.
49. Feimin Huang, Yi Wang and **Tong Yang**, Hydrodynamic limit of the Boltzmann equation with contact discontinuities, *Communications in Mathematical Physics*, 295 (2010), 293-326.
50. Radjesvarane Alexandre, Yoshinori Morimoto, Seiji Ukai, Chao-Jiang Xu and **Tong Yang**, Uncertainty principle and kinetic equations, *Journal of Functional Analysis*, Vol. 255 (2008), no.8, 2013-2066.
51. Feimin Huang, Zhouping Xin and **Tong Yang**, Contact discontinuity with general perturbations for gas motions, *Advances in Mathematics*, Vol. 219 (2008), no.4, 1246-1297.
52. Renjun Duan, Seiji Ukai, **Tong Yang** and Huijiang Zhao, Optimal Decay Estimates on the Linearized Boltzmann Equation with time dependent force and their applications, *Communications in Mathematical Physics*, Vol. 277, No. 1 (2008), 189-236.
53. **Tong Yang** and Huijiang Zhao, Global existence of classical solutions to the Vlasov-Poisson-Boltzmann system, *Communications in Mathematical Physics*, 268, 569-605 (2006).
54. **Tong Yang**, Hongjun Yu and Huijiang Zhao, *Cauchy problem for the Vlasov-Poisson-Boltzmann system*, *Archive for Rational Mechanics and Analysis*, 182, No. 3, 415-470, (2006).
55. Tai-Ping Liu, **Tong Yang**, Shih-Hsien Yu and Huijiang Zhao, *Nonlinear stability of rarefaction waves for Boltzmann equation*, *Archive for Rational Mechanics and Analysis*, 181 (2006), no. 2, 333-371.
56. **Tong Yang** and Huijiang Zhao, *A half-space problem for the Boltzmann equation with specular reflection boundary condition*, *Communications in Mathematical Physics*, 255 (2005), no. 3, 683-727.
57. Alberto Bressan and **Tong Yang**, *On the convergence rate of vanishing viscosity approximations*, *Communications on Pure and Applied Mathematics*, LVII (2004), 1075-1109.
58. Alberto Bressan and **Tong Yang**, A sharp decay estimate for positive nonlinear waves, *SIAM Journal of Mathematical Analysis*, 36 (2004), no. 2, 659-677.
59. Tai-Ping Liu, **Tong Yang** and Shih-Hsien Yu, *Energy method for Boltzmann equation*, *Physica D*, 188 (2004), 178-192.
60. Kenji Nishihara, **Tong Yang** and Huijiang Zhao, *Nonlinear stability of strong rarefaction waves for compressible Navier-Stokes equations*, *SIAM Journal of Mathematical Analysis*, 35 (2004), no. 6, 1561-1597.
61. Seiji Ukai, **Tong Yang** and Shih-Hsien Yu, *Nonlinear stability of boundary layers of the Boltzmann equation, I.  $M^\infty < -1$* , *Communications in Mathematical Physics*, 244 (2004), no. 1, 99-109.
62. Seiji Ukai, **Tong Yang** and Shih-Hsien Yu, *Nonlinear boundary layers of the Boltzmann*

- equation: I, Existence*, Communications in Mathematical Physics, 236 (2003), 373-393.
63. Seungyeal Ha and **Tong Yang**, *L1 stability for systems of hyperbolic conservation laws with a resonant moving source*, SIAM Journal of Mathematical Analysis, 34 (2003), no. 5, 1226-1251.
  64. Yinbin Deng, Tai-Ping Liu, **Tong Yang** and Zheng-an Yao, *Solutions with vacuum of Euler-Poisson equations*, Arch. for Ration. Mechanics and Analysis, 164 (2002), no. 3, 261-285.
  65. Tai-Ping Liu and **Tong Yang**, *Weak solutions of general systems of hyperbolic conservation laws*, Communications in Mathematical Physics, 230 (2002), no. 2, 289-327.
  66. **Tong Yang** and Changjiang Zhu, *Compressible Navier-Stokes equations with degenerate viscosity coefficient and vacuum*, Commun. Math. Physics, 230 (2002), no. 2, 329-363.
  67. Tao Luo, Zhou-Ping Xin and **Tong Yang**, *Interface behaviour of compressible Navier-Stokes equations with vacuum*, SIAM Journal of Mathematical Analysis, 31 (2000), 1175-1191.
  68. Tai-Ping Liu and **Tong Yang**, *L1 stability of weak solutions for  $2 \times 2$  systems of hyperbolic conservation laws*, Journal of American Mathematical Society, 12 (1999), 729-774.
  69. Tai-Ping Liu and **Tong Yang**, *Well-posedness theory for hyperbolic conservation laws*, Communications in Pure and Applied Mathematics, 52 (1999), 1553-1586.
  70. Tai-Ping Liu and **Tong Yang**, *A new entropy functional for scalar conservation law*, Communications on Pure and Applied Mathematics, 52 (1999), 1427-1442.
  71. Alberto Bressan, Tai-Ping Liu and **Tong Yang**, *L1 stability estimates for  $n \times n$  conservation laws*, Archive for Rational Mechanics and Analysis, 149 (1999), 1-22.
  72. Hailiang Liu, Jinghua Wang and **Tong Yang**, *Stability in relaxation scheme with nonconvex flux*, SIAM Journal of Mathematical Analysis, 29 (1998), 18-29.
  73. **Tong Yang**, *A functional integral approach to shock wave solutions of the Euler equations with spherical symmetry*, Communications in Mathematical Physics, 171 (1995), 607-638.

#### PhD students and Postdocs

20 PhD students, 6 Postdocs

#### Selected Recent Plenary Talks

- XVIII international conference on hyperbolic problems: theory, numerics, applications, June 20-25, 2022, Malaga, Spain.
- The Chinese Mathematical Society 2021 Annual Conference, Kunming, China.
- International forum on mathematics and history of mathematics-dedicated to the 100<sup>th</sup> birthday of Wen-Tsun Wu, May 9-10, 2019, Shanghai, China.
- International conference on contemporary applied mathematics, May 7-11, 2018, LIASFMA, Shanghai, China.
- International conference on Partial Differential Equations-Silkroad Mathematics Center series international conferences, April 1-21, 2017, Beijing, China.