

# Curriculum Vitae

## Professor Tong Yang

### Personal Particulars

Name: Tong Yang

Citizenship: Hong Kong Special Administrative Region (HKSAR), China

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### Education

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

### Professional Career

- Chair Professor of Mathematics, City University of Hong Kong 09/2007 - present
- Professor, City University of Hong Kong 07/2002 - 08/2007
- Associate Professor, City University of Hong Kong 07/1999 - 06/2002
- Assistant Professor, 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

- The President of the Hong Kong Mathematical Society, elected in May 2016.
- The President's Award, City University of Hong Kong, Jan. 2016.
- State Natural Science Award (2nd class), P.R. China, 2012.
- Croucher Senior Research Fellowship, 2011/2012.
- Grant Award of Research Excellence Awards, City University of Hong Kong, 2009.
- Changjiang Chair Professor of "The Yangtze River (Changjiang), Scholarship Program" granted by the Ministry of Education of China, 2005.
- Joint Research Fund for Hong Kong and Macau Young Scholars, National Science Fund for Distinguished Young Scholars, 2003.
- General Research Fund of Hong Kong, 1995-2016.

### Current Research Areas

1. **Conservation laws:** Well-posedness theory, structure of solutions, multi-dimensional problems, stability of nonlinear wave patterns and solution profiles, singularity analysis, numerical schemes.

2. **Boltzmann equation:** Phenomena related to fluid dynamics such as nonlinear wave patterns and solution profiles, boundary layer theory, time-periodic solutions and convergence rates, solutions in new function spaces, hypocoercivity problems, regularity of non-cutoff cross-sections.

3. **Boundary layer theories:** Prandtl layer equations, fluid dynamic limits.

### Editorial Board

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|-------------------------------|---|
| Co-editor-in-chief            | Analysis and Applications (since 2013)                |
| Co-editor-in-chief            | Kinetic and Related Models (since 2008)               |
| Member of the editorial board | Acta Mathematicae Applicatae Sinica (Chinese version) |
| Member of the editorial board | Annals of Applied Mathematics                         |

### Selected publications

1. Wei-xi Li and **Tong Yang**, Well-posedness in Gevrey function space for the Prandtl equations with non-degenerate critical points, accepted for publication in Journal of European Mathematical Society.
2. Hailiang Li, Yi Wang, **Tong Yang** and Mingying Zhong, Stability of nonlinear wave patterns to the bipolar Vlasov-Poisson-Boltzmann system, accepted for publication in Archive for Rational Mechanics and Analysis.
3. Chengjie Liu, Feng Xie and **Tong Yang**, MHD boundary layers in Sobolev spaces without monotonicity. I. Well-posedness theory, accepted for publication in Communications on Pure and Applied Mathematics.
4. Chengjie Liu and **Tong Yang**, Ill-posedness of the Prandtl equations in Sobolev spaces around a shear flow with general decay, accepted for publication in Journal de Mathematique Pures et Appliquees.
5. 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).
6. 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).
7. 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).
8. Yoshinori Morimoto, **Tong Yang** and Huijiang Zhao, *Stability of Self-similar Solutions to the Homogeneous Boltzmann Equation*, Journal of European Mathematical Society, 19, 2041-2067(2017).

9. 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).
10. **Tong Yang** and Hongjun Yu, *Spectrum analysis of some kinetic equations*, Archive for Rational Mechanics and Analysis, 222(2016), 731-768.
11. 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, April 2016, 83-108.
12. 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.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. 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.
19. 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), 2014, 1741-1811.
20. 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.
21. 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.

22. 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.
23. 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.
24. 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.
25. 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.
26. **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.
27. 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.
28. 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).
29. **Tong Yang** and Hongjun Yu, *Optimal convergence rates of classical solutions for Vlasov-poisson-Boltzmann System*, Communications in Mathematical Physics, 301, 319-355(2011).
30. 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.
31. **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.
32. 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.
33. Feimin Huang, Yi Wang and **Tong Yang**, *Hydrodynamic limit of the Boltzmann equation with contact discontinuities*, Communications in Mathematical Physics, 295(2010), 293-326.

34. Jiale Hua, Zaihong Jiang and **Tong Yang**, *A new Glimm functional and convergence rate of Glimm scheme for general systems of hyperbolic conservation laws*, Archive for Rational Mechanics and Analysis, 196(2010), 433-454.
35. 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.
36. 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.
37. 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.
38. **Tong Yang** and Huijiang Zhao, *Global existence of classical solutions to the Vlasov-Poisson-Boltzmann system*, Communications in Mathematical Physics, 268, 569-605(2006).
39. **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.
40. 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.
41. **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.
42. Alberto Bressan and **Tong Yang**, *On the convergence rate of vanishing viscosity approximations*, Communications on Pure and Applied Mathematics, LVII(2004), 1075-1109.
43. Alberto Bressan and Tong Yang, *A sharp decay estimate for positive nonlinear waves*, SIAM Journal of Mathematical Analysis, 36(2004), no. 2, 659-677.
44. Tai-Ping Liu, **Tong Yang** and Shih-Hsien Yu, *Energy method for Boltzmann equation*, Physica D, 188(2004), 178-192.
45. 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.
46. 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.

47. 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.
48. 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.
49. Yinbin Deng, Tai-Ping Liu, Tong Yang and Zheng-an Yao, *Solutions with vacuum of Euler-Poisson equations*, Archive for Rational Mechanics and Analysis, 164(2002), no. 3, 261-285.
50. 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.
51. **Tong Yang** and Changjiang Zhu, *Compressible Navier-Stokes equations with degenerate viscosity coefficient and vacuum*, Communications in Mathematical Physics, 230(2002), no. 2, 329-363.
52. 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.
53. 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.
54. Tai-Ping Liu and **Tong Yang**, *Well-posedness theory for hyperbolic conservation laws*, Communications in Pure and Applied Mathematics, 52(1999), 1553-1586.
55. Tai-Ping Liu and **Tong Yang**, *A new entropy functional for scalar conservation law*, Communications on Pure and Applied Mathematics, 52(1999), 1427-1442.
56. 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.
57. Hailiang Liu, Jinghua Wang and **Tong Yang**, *Stability in relaxation scheme with nonconvex flux*, SIAM Journal of Mathematical Analysis, 29(1998), 18-29.
58. **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.