Chuanju Xu's Curriculum Vitae

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Identification

Professor Chuanju Xu
School of Mathematical Sciences
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Education

Xiamen University	Pure Mathematics	B.S.	1982-1986
Université de Paris-Sud	Numerical Analysis	DEA	1988-1989
Université de Paris-VI	Numerical Analysis	Ph.D	1989-1993

Languages proficiency

- Chinese: Maternal language
- French: read, write, and speak
- English: read, write, and speak

Research interests

Numerical partial differential equations, Spectral (element) methods, Computational fluid dynamics, Fractional differential equations

Publications in refereed journals: 95

Citations (google scholar): 3666

H index (google scholar): 19

Professional Appointments

July 1993 – Present	*Assistant to Associate to Professor to Chair Professor*, *School of Mathematical Sciences*, *Xiamen University.*
July 2008 – 2017	*Vice Dean*, *School of Mathematical Sciences Xiamen University.*
July 2019	Visiting Professor, Université de Bordeaux.
July – Sept 2018	Visiting Professor, Université de Bordeaux.
July – Sept 2016	Visiting Professor, Université de Bordeaux.
Oct. 2015	Visiting Professor, Université de Poitiers.
Dec. 2014	Visiting Professor, Université de Bordeaux.
Jan. – Feb. 2012	Visiting Senior Research Fellow, Department de Mathematics, National University of Singapore.
Aug. – Sept. 2008	Visiting Research Fellow, Purdue University.
March – May 2004	Visiting Research Fellow, Department de Mathematics, Hong Kong Baptist University.
June – July 1999	Visiting Research Fellow, Department of Energy Engineering, Denmark Technology University.
Sept. 1998 – June 1999	Visiting Scholar, Department de Mathematics, Université de Nice.

Member of the editorial boards

- Communications on Applied Mathematics and Computation (2019 — present)
- SIAM Journal on Scientific Computing (2017 — present)
- AIMS Mathematics (2017 — present)
- Journal on Numerical Methods and Computer Applications (in Chinese, 2014 — present)
- Journal of Mathematical Study (2014 — present)
- Discrete and Continuous Dynamical Systems - Series S (2013 — present)
- East Asia Journal on Applied Mathematics (2011 — present)
- Numerical Mathematics: Theory, Methods and Applications (2007 — 2016)
- Numer. Math. J. Chinese Univ. (2005 — present)

Representative publications

- Dianming Hou, Hongyi Zhu, Chuanju Xu *Highly efficient schemes for time-fractional Allen-Cahn equation using extended SAV approach*, Numerical Algorithms, 2021, 1-32 [**citation 3**];
- Dianming Hou, Mejdi Azaiez, Chuanju Xu, *A variant of scalar auxiliary variable approaches for gradient flows*, Journal of Computational Physics, 2019, **395**, 307-332 [**citation 16**];
- Fangying Song, Chuanju Xu, GE Karniadakis, Computing Fractional Laplacians on Complex-Geometry Domains: Algorithms and Simulations, SIAM Journal on Scientific Computing, 2017, **39**(4), A1320-A1344 [**citation 39**];
- Fangying Song, Chuanju Xu, George Em Karniadakis, *A fractional phase-field model for two-phase flows with tunable sharpness: Algorithms and simulations*, Comput. Methods Appl. Mech. Engrg. 2016, **305**, 376-404 [**citation 59**];
- Xianjuan Li, Tao Tang, and Chuanju Xu, Parallel in time algorithm with spectral-subdomain enhancement for volterra integral equations, SIAM J. Numer. Anal, 2013, **51**(3), p1735-1756 [**citation 37**];
- Xianjuan Li, Chuanju Xu, *Existence and Uniqueness of the Weak Solution of the Space-Time Fractional Diffusion Equation and a Spectral Method Approximation*, Commun. Comput. Phys., 2010, **8**(5), p1016-1051 [**citation 276**];
- Xianjuan Li, Chuanju Xu, A Space-Time Spectral Method for the Time Fractional Diffusion Equation, SIAM J. Numer. Anal., 2009, **47**(3), p2108-2131 [**citation 611**];
- Mejdi Azaiez, Jie Shen, Chuanju Xu, and Q. Zhuang, *A Laguerre/Legendre Spectral Method for the Stokes Problem in a Semi-Infinite Channel*, SIAM J. Numer. Anal., 2008, **47**(1), p271-292 [**citation 24**];

- Yumin Lin, Chuanju Xu, *Finite difference/spectral approximations for the time-fractional diffusion equation*, J. Comput. Phys., 2007, **225**(2), p1533-1552 [**citation 1303**];
- Chuanju Xu and Tao Tang, *Stability Analysis of Large Time-Stepping Methods for Epitaxial Growth Models*, SIAM J. Numer. Anal. 2006, **44**(4), p1759-1779 [**citation 239**];
- Chuanju Xu, R.Pasquetti, *Stabilized spectral element computations of high Reynolds number incompressible flows*, J. Comput. Phys., 2004, **196**(2), p680-704 [**citation 61**].

Publications

- Dianming Hou, Chuanju Xu, *Robust and stable schemes for time fractional molecular beam epitaxial growth model using SAV approach*, Journal of Computational Physics, 2021, **445**, 110628;
- Hui Yao, Mejdi Azaiez, Chuanju Xu, *New Unconditionally Stable Schemes for the Navier-Stokes Equations*, Communications in Computational Physics, 2021, 1-35;
- Bin Fan, Chuanju Xu, *Inexact Newton regularization combined with two-point gradient methods for nonlinear ill-posed problems*, Inverse Problems, 2021, **37**(4), 045007;
- Enze Shi, Chuanju Xu, *A comparative investigation of neural networks in solving differential equations*, Journal of Algorithms & Computational Technology, 2021, **15**, 1748302621998605;
- Dianming Hou, Hongyi Zhu, Chuanju Xu, *Highly efficient schemes for time-fractional Allen-Cahn equation using extended SAV approach*, Numerical Algorithms, 2021, 1-32;
- Xingyang Ye, Chuanju Xu, *A posteriori error estimates of spectral method for the fractional optimal control problems with non-homogeneous initial conditions*, AIMS Mathematics, 2021, **6**(11), 12028-12050;
- Bin Fan, Mejdi Azaiez, Chuanju Xu, *An extension of the landweber regularization for a backward time fractional wave problem*, Discrete & Continuous Dynamical Systems-S, 2021, **14**(8), 2893;
- Junying Cao, Zhiqiang Wang, Chuanju Xu, *A High-Order Scheme for Fractional Ordinary Differential Equations with the Caputo-Fabrizio Derivative*, Communications on Applied Mathematics and Computation, 2020, **2**(2), 179-199;
- Xiaolan Zhou, Mejdi Azaiez, Chuanju Xu, *SAV Method Applied to Fractional Allen-Cahn Equation*, Spectral and High Order Methods for Partial Differential Equations (ICOSAHOM 2018), Springer proceeding, 2020, 489-500;
- M. T. Hasan, Chuanju Xu, *High order finite difference/spectral methods to a water wave model with nonlocal viscosity*, Journal of Computational Mathematics, 2020, **38**(4), 580-605;
- Xingyang Ye, Shimin Lin, Chuanju Xu, *Dynamical analysis of a fractional-order avian-human influenza epidemic model with logistic growth for avian population*, Journal of Algorithms & Computational Technology, 2020, **14**, 1748302620966704;

- M. T. Hasan, Chuanju Xu, *The stability and convergence of time-stepping/spectral methods with asymptotic behaviour for the Rosenau-Burgers equation*, Applicable Analysis, 2020, **99**(12), 2013-2025;

- Xiaolan Zhou, Mejdi Azaiez, Chuanju Xu, *Reduced-Order Modelling for the Allen-Cahn Equation Based on Scalar Auxiliary Variable Approaches*, Journal of Mathematical Study, 2019, **52** (3), 258-276;

- Dianming Hou, Yumin Lin, Mejdi Azaiez, Chuanju Xu, *A Muntz-Collocation Spectral Method for Weakly Singular Volterra Integral Equations*, Journal of Scientific Computing, 2019, **81** (3), 2162-2187;

- Chuanju Xu, *Spectral methods for some kinds of fractional differential equations*, Handbook of Fractional Calculus with Applications, Vol. 3, De Gruyter, 2019, 101-126;

- Xingyang Ye, Chuanju Xu, *A fractional order epidemic model and simulation for avian influenza dynamics*, Mathematical Methods in the Applied Sciences, 2019, **42** (14), 4765-4779;

- Hongyi Zhu, Chuanju Xu, *A Fast High Order Method for the Time-Fractional Diffusion Equation*, SIAM Journal on Numerical Analysis, 2019, **57** (6), 2829-2849;

- Dianming Hou, Mejdi Azaiez, Chuanju Xu, *Muntz Spectral Method for Two-Dimensional Space-Fractional Convection-Diffusion Equation*, Communications in Computational Physics, 2019, **26**(5), 1415-1443;

- Dianming Hou, Mejdi Azaiez, Chuanju Xu, *A variant of scalar auxiliary variable approaches for gradient flows*, Journal of Computational Physics, 2019, **395**, 307-332;

- Xiaoling Liu, Fangying Song, Chuanju Xu, *An Efficient Spectral Method for the Inextensible Immersed Interface in Incompressible Flows*, Communications in Computational Physics, 2019, **25**(4), 1071-1096;

- Laurence Cherfils, Alain Miranville, Shuiran Peng, Chuanju Xu, *Analysis of discretized parabolic problems modeling electrostatic micro-electromechanical systems*, Discrete & Continuous Dynamical Systems-S, 2019, **12**(6), 1601-1621;

- Chunwan Lv, M. Azaiez, Chuanju Xu, Spectral Deferred Correction Methods for Fractional Differential Equations, Numerical Mathematics-Theory Methods and Applications, 2018, **11**(4), 729-751;

- Shimin Lin, Mejdi Azaiez, and Chuanju Xu, A fractional Stokes equation and its spectral approximation, International journal of numerical analysis and modeling, 2018, **15**(1-2), 170-192;

- Dianming Hou, M. T. Hasan, Chuanju Xu, *Muntz spectral methods for the time-fractional diffusion equation*, Computational Methods in Applied Mathematics, 2018, **18**(1), 43-62;

- Xiaojun Zhou and Chuanju Xu, Analysis of a system of autonomous fractional differential equations, International Journal of Biomathematics, 2017, 10(07), 1750094;

- Shimin Lin, Mejdi Azaiez, and Chuanju Xu, Using PGD to Solve Nonseparable Fractional Derivative Elliptic Problems, Springer Lecture Notes in Computational Science and Engineering book series (LNCSE, volume 119): Spectral and High Order Methods for Partial Differential Equations ICOSAHOM2016, 2017, 203-213;
- Fangying Song, Chuanju Xu, and GE Karniadakis, Computing Fractional Laplacians on Complex-Geometry Domains: Algorithms and Simulations, SIAM Journal on Scientific Computing, 2017, 39(4), A1320-A1344;
- Xiaojun Zhou, Chuanju Xu, Numerical Solution of the Coupled System of Nonlinear Fractional Ordinary Differential Equations, Advances in Applied Mathematics and Mechanics, 2017, 9(3), 574-595;
- Xiaoling Liu, Chuanju Xu, Efficient Time-Stepping/Spectral Methods for the Navier-Stokes-Nernst-Planck-Poisson Equations, Communications in Computational Physics, 2017, 21(5), 1408-1428;
- Dianming Hou, M. Hassan, and Chuanju Xu, Muntz Spectral Methods for the Time-Fractional Diffusion Equation, Computational Methods in Applied Mathematics, 2017, 18(1), 43-62;
- Dianming Hou, Chuanju Xu, A fractional spectral method with applications to some singular problems, Advances in Computational Mathematics, 2017, 43(5), 911-944;
- Fangying Song, Chuanju Xu, George Em Karniadakis, A fractional phase-field model for two-phase flows with tunable sharpness: Algorithms and simulations, Comput. Methods Appl. Mech. Engrg. 2016, 305, 376-404;
- Shimin Lin and Chuanju Xu, Theoretical and Numerical Investigation of Fractional Differential Equations (in Chinese), Mathematica Numerica Sinica, 2016, 38(1), p1-24;
- Xiaojun Zhou and Chuanju Xu, Well-posedness of a kind of nonlinear coupled system of fractional differential equations, SCIENCE CHINA Mathematics, 2016, 59(6), p1209-1220;
- Xingyang Ye and Chuanju Xu, A spectral method for optimal control problems governed by the abnormal diffusion equation with integral constraint on state (in Chinese), SCIENCE CHINA Mathematics, 2016, 46(7), p1053-1070;
- Chunwan Lv and Chuanju Xu, Error analysis of a high order method for time-fractional diffusion equations, SIAM J. Sci. Comput., 2016, 38(5), pA2699-A2724;
- Yanhui Su, Lizhen Chen, Xianjuan Li and Chuanju Xu, On the Inf-Sup Constant of a Triangular Spectral Method for the Stokes Equations, Comput. Methods Appl. Math. 2016, DOI: 10.1515/cmam-2016-0011;
- F.Y.Song and C.J.Xu, Spectral direction splitting methods for two-dimensional space fractional diffusion equations, Journal of Computational Physics, 2015, 299(15), p196-214;
- Xianjuan Li, Tao Tang, and Chuanju Xu, Numerical Solutions for Weakly Singular Volterra Integral Equations Using Chebyshev and Legendre Pseudo-Spectral Galerkin Methods, J Sci Comput, 2015, DOI 10.1007/s10915-015-0069-5;

- Chunwan Lv and Chuanju Xu, Improved error estimates of a finite difference/spectral method for time-fractional diffusion equations, International Journal of Numerical Analysis and Modeling, 2015, 12(2), p384-400;
- Xingyang Ye and Chuanju Xu, A posteriori error estimates for the fractional optimal control problems, Journal of Inequalities and Applications, 2015, 141, p1-13;
- Xingyang Ye and Chuanju Xu, A space-time spectral method for the time fractional diffusion optimal control problems, Advances in Difference Equations, 2015:156, DOI 10.1186/s13662-015-0489-4;
- F.Y.Song, X.L. Liu, C.J.Xu, A Spectral Element Method for Human Carotid Atherosclerotic Plaques, Chinese Journal of Engineering Mathematics, 2015(4), p546-556;
- Weiwei Wang, Chuanju Xu, Spectral methods based on new formulations for coupled Stokes and Darcy equations, Journal of Computational Physics, 2014, 257, p126-142;
- Jun Zhang and Chuanju Xu, Finite difference/spectral approximations to a water wave model with a nonlocal viscous term, Applied Mathematical Modelling, 2014, 38, p4912-4925;
- Lizhen Chen, Jie Shen, Chuanju Xu, and Lishi Luo, Parallel spectral-element direction splitting method for incompressible Navier-Stokes equations, Applied Numerical Mathematics, 2014, 84, p66-79;
- Junying Cao, Chuanju Xu, and Ziqiang Wang, A high order finite difference/spectral approximations to the time fractional diffusion equations, Advanced Materials Research, 2014, 875-877, p781-785;
- Xingyang Ye and Chuanju Xu, A Spectral Method for Optimal Control Problems Governed by the Time Fractional Diffusion Equation with Control Constraints, ICOSAHOM 2012, Lecture Notes in Computational Science and Engineering, Springer, 2014, 95, p403-414;
- Xianjuan Li, Tao Tang, and Chuanju Xu, Parallel in time algorithm with spectral-subdomain enhancement for volterra integral equations, SIAM J. Numer. Anal, 2013, 51(3), p1735-1756;
- Junying Cao, Chuanju Xu, A high order schema for the numerical solution of the ordinary fractional differential equations, Contemporary Mathematics, 2013, 586, http://dx.doi.org /10.1090/conm/586/11658;
- Xingang Ye, Chuanju Xu, Spectral Optimization Methods for the Time Fractional Diffusion Inverse Problem, Numer. Math. Theor. Meth. Appl., 2013, 6(3), p499-519;
- Junying Cao, Chuanju Xu, A high order schema for the numerical solution of the fractional ordinary differential equations, Journal of Computational Physics, 2013, 238, p154-168;
- Dong Qu, Chuanju Xu, Generalized Polynomial Chaos Decomposition and Spectral Methods for the Stochastic Stokes Equations, Computers & Fluids, 2013, 71, p250-260;
- Lizhen Chen, Jie Shen, and Chuanju Xu, A Unstructured Nodal Spectral-Element Method for the Navier-Stokes Equations, Commun. Comput. Phys., 2012, 12(1), p315-336;

- Yumin Lin, Xianjuan Li, and Chuanju Xu, Finite Difference/Spectral Approximation for the Fractional Cable Equations, Mathematics of Computation, 2011, 80(275), p1369-1396;
- Lizhen Chen, Jie Shen, and Chuanju Xu, A Triangular Spectral Method for the Stokes Equations, Numer. Math. Theor. Meth. Appl., 2011, 4(2), p158-179;
- Lizhen Chen, Jie Shen, and Chuanju Xu, Spectral Direction Splitting Schemes for the Incompressible Navier-Stokes Equations, East Asian Journal on Applied Mathematics, 2011, 1(3), p215-234;
- Claude-Michel Brauner, Luca Lorenzi, Gregory I. Sivashinsky, and Chuanju Xu, On a Strongly Damped Wave Equation for the Flame Front, Chinese Annals of Mathematics, 2010, 31B(6), p819-840;
- Qingqu Zhuang, Chuanju Xu, Legendre-Laguerre coupled spectral element methods for second- and fourth-order equations on the half line, Journal of Computational and Applied Mathematics, 2010, 235, p615-630;
- Xianjuan Li, Chuanju Xu, Existence and Uniqueness of the Weak Solution of the Space-Time Fractional Diffusion Equation and a Spectral Method Approximation, Commun. Comput. Phys., 2010, 8(5), p1016-1051;
- Dong Qu, Chuanju Xu, Discrete variational adjoint assimilations for parameter optimizations via spectral methods, Inverse Problems in Science and Engineering, 2010, 18(3), p417-436;
- Qingqu Zhuang, Jie Shen, and Chuanju Xu, A Coupled Legendre-Laguerre Spectral-Element Method for the Navier-Stokes Equations in Unbounded Domains, J. Sci. Comput., 2010, 42(1), p1-22;
- Xianjuan Li, Chuanju Xu, A Finite Difference/Spectral Element Method for the Fractional Nernst-Planck Equation, Chinese Journal of Engineering Mathematics (in Chinese), 2010, 27(2), p207-218;
- Xianjuan Li, Chuanju Xu, A Space-Time Spectral Method for the Time Fractional Diffusion Equation, SIAM J. Numer. Anal., 2009, 47(3), p2108-2131;
- Zhijian Rong, Chuanju Xu, Spectral Vanishing Viscosity for Large-Eddy Simulations by Spectral Element Methods, Chinese Journal of Theoretical and Applied Mechanics, 2009, 41(2), p155-161;
- Mejdi Azaiez, Jie Shen, Chuanju Xu, and Qingqu Zhuang, A Laguerre/Legendre Spectral Method for the Stokes Problem in a Semi-Infinite Channel, SIAM J. Numer. Anal., 2008, 47(1), p271-292;
- Zhijian Rong, Chuanju Xu, Numerical approximation of acoustic waves by spectral element methods, Appl. Numer. Math., 2008, 58(2), p999-1016;
- Zhijian Rong, Chuanju Xu, A $P_N \times P_N$ Spectral Element Projection Method for the Unsteady Incompressible Navier-Stokes Equations, Numer. Math. Theor. Meth. Appl., 2008, 1, p275-296;

- Yumin Lin, Chuanju Xu, Finite difference/spectral approximations for the time-fractional diffusion equation, J. Comput. Phys., 2007, 225(2), p1533-1552;
- Chuanju Xu, Yumin Lin, A numerical comparison of outflow boundary conditions for spectral element simulations of incompressible flows, Commun. Comput. Phys., 2007, 2, p477-500;
- Liang Jiang, Chuanju Xu, Spectral Element Viscosity Methods for Nonlinear Conservation Laws on the Semi-Infinite Interval, Numer. Math. (J. Chinese Univ.), 2007, 16(2), p112-130;
- Chuanju Xu, Tao Tang, Stability Analysis of Large Time-Stepping Methods for Epitaxial Growth Models, SIAM J. Numer. Anal. 2006, 44(4), p1759-1779;
- Qingqu Zhuang, Chuanju Xu, A Spectral Element/Laguerre Coupled Method to the Elliptic Helmholtz Problem on the Half Line, Numer. Math. (J. Chinese Univ.), 2006, 15(3), p193-208;
- Chuanju Xu, Stabilization Methods for Spectral Element Computations of Incompressible Flows, Journal of Scientific Computing, 2006, 27(1-3), p495-505;
- Taoli Hong, Chuanju Xu, A MPI parallel preconditioned spectral element method for the Helmholtz equation, Numer. Math. (J. Chinese Univ.), 2005, 14(1), p56-66;
- Fenghui Huang, Chuanju Xu, On the error estimates for the rotational pressure-correction projection spectral methods for the unsteady Stokes equations, J. Comput. Math., 2005, 23(3), p285-304;
- Chuanju Xu, R.Pasquetti, Stabilized spectral element computations of high Reynolds number incompressible flows, J. Comput. Phys., 2004, 196(2), p680-704;
- Yumin Lin, Chuanju Xu, A fractional step method for the unsteady viscous/inviscid coupled equations, proceeding of SCA03, Hong Kong City University, Sciences press, 2004;
- Yumin Lin, Chuanju Xu, A fractional step method for the time dependent incompressible Navier-Stokes/Euler coupled equations, Acta Aerodynamica Sinica, 2003, 21(3), p368-376;
- R.Pasquetti, Chuanju Xu, Note: Comments on Filter-Based Stabilization of Spectral Element Methods, J. Comput. Phys., 2002, 182, p646-650;
- R.Pasquetti, Chuanju Xu, High-Order Algorithms for Large-Eddy Simulation of incompressible Flows, J. Scient. Computing, 2002, 17(1-3), p273-284;
- Fenghui Huang, Chuanju Xu, A spectral element method of the viscous/inviscid coupled equations in complex geometries, J.of Xiamen Univ., 2002, 41(3), p291-296;
- Chuanju Xu, R.Pasquetti, On the efficiency of the semi-Lagrangian method for the incompressible flow, Inter. J Numer. Meth. Fluids, 2001, 35, p319-340;
- W.Borchers, S.Krautle, R.Pasquetti, R.Rautmann, K.Wielage, Chuanju Xu, Towards a parallel hybrid highly accurate Navier-Stokes solver, Numerical Flow Simulation II, NNFM 75, Hirschel Ed., Springer, 2001;

- Chuanju Xu, An efficient method for the Navier-Stokes/Euler coupled equations via a spectral element approximation, SIAM J. Numer. Anal., 2000, 38(4), p1217-1242;
- Chuanju Xu, Yumin Lin, Open boundary conditions for the spectral simulation of Poiseuille-Benard flow, Acta mechanica sinica, 2000, 32(1), p1-10;
- Chuanju Xu, Yumin Lin, Analysis of iterative methods for the viscous/inviscid coupled problem via a spectral element approximation, Inter. J Numer. Meth. Fluids, 2000, 32, p619-646;
- Chuanju Xu, An iterative method for the Navier-Stokes/Euler coupled equations, J. Comput. Math., 1999, 4, p379-396;
- Chuanju Xu, Y. Maday, A Spectral element method for the Euler equations: Application to flow simulations, J. Computational & Applied Mathematics, 1998, 91(1), p63-85;
- Chuanju Xu, Y.Maday, A global algorithm in spectral method for viscous/inviscid coupling, Chinese Annual of Math.(B), 1997, 18(2), p191-200;
- Chuanju Xu, A global algorithm on the coupling of Navier-Stokes/Euler equations, Houston J. of Mathematics, 1996, ICOSAHOM'95, p151;
- Chuanju Xu, A slight overintegration spectral method approximation on the 2D evolutional Euler equations, Chin.J.of Contemporary Math., 1996, 17(4), p319-327.

Supervision of PhD students

- 19 graduated:

  Fenghui Huang (2004), Zhijian Rong (2007), Qingqu Zhuang (2008) Xianjuan Li (2009), Dong Qu (2009), Lizhen Chen (2011) Weiwei Wang (2012), Xingyang Ye (2012), Junying Cao (2012), Xiaoling Liu (2013), Dalihan Haliman (2013), Jun Zhang (2013), Fangying Song (2014), Xiaojun Zhou (2014), Chunwan Lv (2016), Mohammad Tanzil Hasan (2017), Shimin Lin (2017), Hongyi Zhu (2019), Dianming Hou (2019).

Book

- Linear Algebra, Science Press, Bejing, 2001.
- Probability and Statistics, High education Press, Beijing, 2003.

Code development

3D spectral elements code with turbulence models.