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Preface

Special Issue Dedicated to Professor Zhenhuan Teng's 80th Birthday

This special issue is dedicated to Professor Zhenhuan Teng of Peking University to celebrate his 80th birthday and to show our sincere respect for his excellent contributions in mathematical education and original research.

Professor Teng was born in Beijing in May 1937. He graduated from the Department of Mathematics and Mechanics at Peking University (PKU) in 1960, and stayed on for another three years for his postgraduate study. In 1964, he became a faculty member in the Department of Mathematics at PKU and spent his entire career there. He was promoted to Full Professor in 1985 and was later appointed as a PhD supervisor in Computational Mathematics by the Ministry of Education in 1985. He chaired the Department of Scientific & Engineering Computing at PKU from 1995 to 1999, and served as the President of Beijing Computational Mathematics Society from 1996 to 1999.

Professor Teng was among the earliest Chinese scholars to visit USA after the culture revolution. He visited the Department of Mathematics of UC Berkeley from 1979-1981, where he began his research on vortex method with Professor Alexander Chorin. He also visited and/or lectured at many other institutions, including UCLA, CalTech, Penn State University, Georgia Tech, University of Oxford, University of Leeds, Simon Fraser University, Kyoto University, Hong Kong Baptist University, and Chinese University of Hong Kong.

Professor Teng's research has been focused on the analysis and computation of nonlinear time-dependent PDEs. His first series of research contributions is about the development of vortex blob method, with particular application to incompressible flows as highlighted in the following publications:

- Z. H. Teng, Elliptic-vortex method for incompressible flow at high Reynolds number, J. Comput. Phys., 48 (1982), 54–68.
- Z. H. Teng, Variable-elliptic-vortex method for incompressible flow simulation, J. Comput. Math., 4 (1986), 255–262.
- Z. H. Teng, L. A. Ying and P. W. Zhang, Convergence of the variable-elliptic-vortex method for Euler equations, SIAM J. Numer. Anal., 32 (1995), 754–774.

In another line of research, Professor Teng studied extensively on the numerical methods for conservation laws, with special attention to the rate of convergence of monotone and viscosity methods in the following work:

- T. Tang and Z. H. Teng, Error bounds for fractional step methods for conservation laws with source terms, SIAM J. Numer. Anal., 32 (1995), 110–127.
- T. Tang and Z. H. Teng, The sharpness of Kuznetsov's $\mathcal{O}(\sqrt{\Delta x})$ L^1-error estimate for monotone difference schemes, Math. Comput., 64 (1995), 581–589.
- Z. H. Teng and P. W. Zhang, Optimal L^1-rate of convergence for the viscosity method and monotone scheme to piecewise constant solutions with shocks, SIAM J. Numer. Anal., 34 (1997), 959–978.
- T. Tang and Z. H. Teng, Viscosity methods for piecewise smooth solutions to scalar conservation laws, Math. Comput., 66 (1997), 495–526.
- Z. H. Teng, First-order L^1-convergence for relaxation approximations to conservation laws, Commun. Pure Appl. Math., 51 (1998), 857–895.
- Z. H. Teng, Error bound between monotone difference schemes and their modified equations, Math. Comput., 79 (2010), 1473–1491.

Professor Teng also made important contributions in other areas of applied mathematics, with the following representative publications:

- Z. H. Teng, A. J. Chorin and T. P. Liu, Riemann problems for reacting gas, with applications to transition, SIAM J. Appl. Math., 42 (1982), 964–981.
- W. Y. Hsiang, Z. H. Teng and W. C. Yu, New examples of constant mean curvature immersions of $(2k-1)$-spheres into Euclidean $2k$-space, Ann. Math., 117 (1983), 609–625.
- Z. H. Teng, Exact boundary condition for time-dependent wave equation based on boundary integral, J. Comput. Phys., 190 (2003), 398–418.