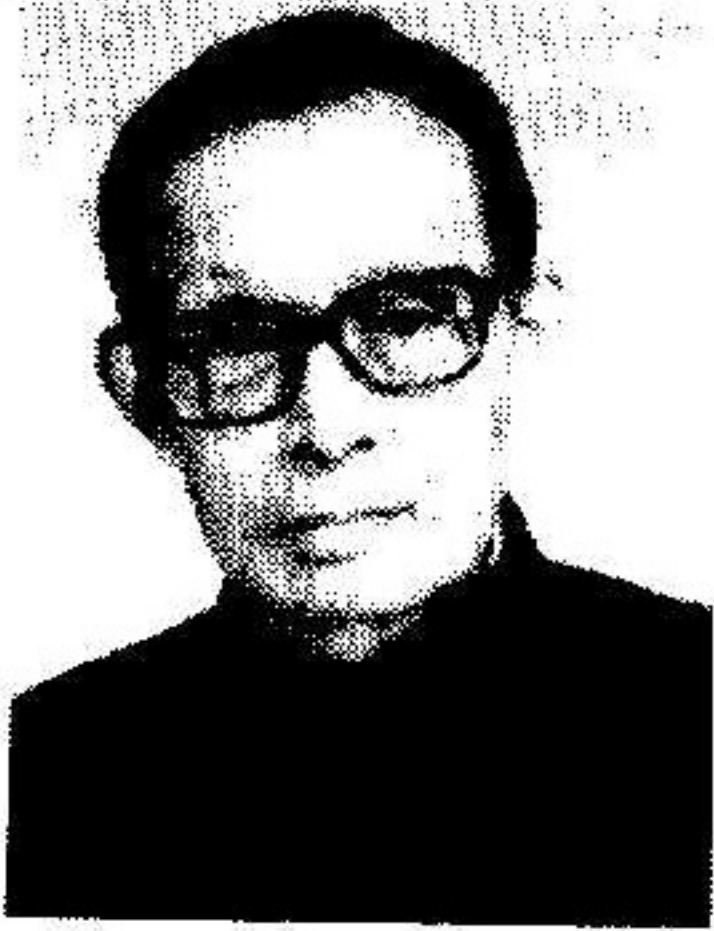


HAPPY BIRTHDAY, PROFESSOR ZHOU YU-LIN!



February 12, 1993 is the 70th birthday of Professor Zhou Yu-lin, an outstanding mathematician, Member of the Chinese Academy of Sciences. We extend here our sincere congratulations to him.

Professor Zhou Yu-lin was born in Shanghai, with the ancestral home in Zhenhai, Zhejiang Province. As early as he studied in middle school, he had favored mathematics, especially plane geometry, and discovered the recurrence theorems. The simplest case of these results was published (in Chinese) on Bulletin of Mathematics later. This preliminary showed his talent in mathematics.

In September, 1941, he entered the Department of Mathematics at Datong University in Shanghai, where he received his B.S. degree in 1945. Besides his major subjects, he studied all the courses on physics (theory and experiments); all these played an important role in his later remarkable achievements in partial differential equations and computational mathematics, etc.

Since 1946, he had been working for the Institute of Mathematics in the Chinese Central Academy of Sciences in Nanking, the Department of Mathematics at Tsinghua University in Beijing and the Department of Mathematics and Mechanics at Peking University, one after another. During this period, he had the opportunity to do some research work on manifold and topology under the guidance of Professor S.S. Chern.

From 1954 to 1957 he was a postgraduate student of the Department of Mathematics at Moscow University in U.S.S.R., to study the theory of partial differential equations, under the supervision of Professor O.A. Oleinik. He received a Candidate doctor's degree of physical and mathematical sciences there in 1957.

From August 1957 Professor Zhou worked in the Department of Mathematics and Mechanics at Peking University, where he was an associate director of the Teaching and Research Section of Partial Differential Equation. Later he served as a deputy director of the Institute of Applied Physics and Computational Mathematics.

Professor Zhou started his academic career from studying combinatorial topology in the late 40's. In 1957, he gave a course on nonlinear elliptic and parabolic equations at Peking University, organized seminars, taught the method of *a priori* estimates and researched the basic framework of nonlinear problems. This is a landmark in the PDE research in China. Professor Zhou is a pioneer and founder of the research on nonlinear partial differential equations, especially nonlinear elliptic and parabolic equations in our country.

His main work in the 50's can be classified into the following three aspects:

- 1) His joint work with O. A. Oleinik and A. C. Kalashnikov on porous media equation^[3], which was considered to be the foundation work on quasilinear degenerate parabolic equations. For a long time large amount of research work in this field has been conducted within the framework of this paper all around the world.

2) His research work on the existence of global solutions of Neumann boundary value problems for quasilinear parabolic equations of second order, which is the main part of his dissertation^[4]. Professor Zhou creatively chose a proper research framework—the Rothe's method, in this dissertation, where he ingeniously gave a method of *a priori* estimates for the derivatives of solutions and constructed the auxiliary functions featuring the nature of the problem. By this way, he successfully proved the existence of the global solution. This paper is still referenced frequently by the researchers studying the boundary value problems for nonlinear parabolic equations, at home and abroad.

3) His research work extends the classical results about the linear degenerate elliptic equations of second order in plane obtained by U.S.S.R. mathematician M.V.Keldish to quasilinear equations^[6]. The condition on the nonlinear terms assumed in^[6] is natural and nearly sharp. This work has greatly influenced the PDE researchers in China and a quite lot of new results have been obtained since then.

Since late 70's, Professor Zhou has done a lot of excellent research work on nonlinear evolution equations and systems, including equations of nonlinear Schrödinger type, Sine-Gordon type, Korteweg-de Vries type, Sobolev-Gal'pern type, pseudo-hyperbolic and nonlinear wave systems, the water wave equations of Benjamin-One type and Joseph type, and their generalizations; and various kinds of coupled systems, etc. He has studied the global existence, uniqueness, blow up, asymptotic behavior, etc. of solutions for these equations and systems. The said results especially the various results about global solutions for strongly degenerate and strongly coupled nonlinear systems of ferro-magnetic chain (Landau-Lifshitz type) are highly valued at home and abroad.

Finite difference methods are of universal applicability to the numerical computations for all types of nonlinear partial differential equations. Professor Zhou established the interpolation relations between the classes of discrete functions in the sense of norms, studied the finite difference schemes for various nonlinear evolution partial differential equations and, for many commonly used difference schemes, studied their basic properties such as the relative and absolute convergence and stability. It is Professor Zhou who makes the theoretical study of finite difference method form a new direction. These results are included in one of his monographs^[17].

To meet the demands of large-scale scientific computations, Professor Zhou analysed the mechanism of the accumulation process of round-off errors, deduced the compatible relations between the main performance indicators such as speed, memory and word length, etc., thus provided a basis for efficiently designing and using supercomputers.

Since 1960, Professor Zhou studied systematically the numerical methods for one- and two-dimensional fluid dynamics and some physical equations, from theoretical analysis to mechanical and physical images. By way of analysing in detail the interaction of waves in the motion of fluids and the structure of the solutions for Riemann problem, he developed and enriched R.Courant's and K.O.Friedrichs's original results (for detail, see [18]). During the same period, he also proposed many concrete computational methods of practical values.

Since 1978, Professor Zhou has been a vice president, the president of the Chinese Society of Computational Mathematics, an advisor of Chinese Society of Computational Physics, associate editor in chief or executive editor or advisor of "Journal of Computational Mathematics", "Mathematica Numerica Sinica", "Journal on Numeri-