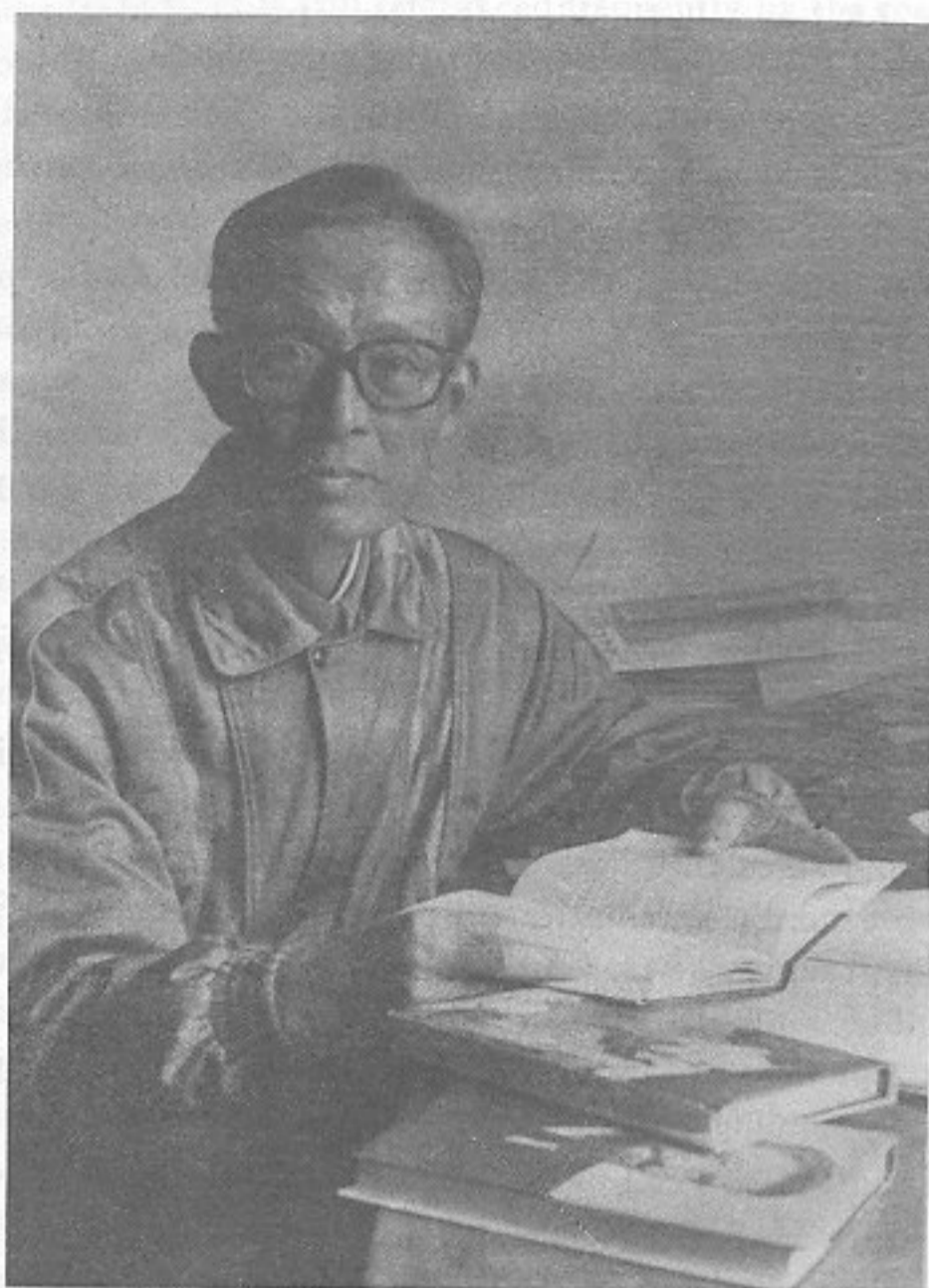# HAPPY BIRTHDAY, PROFESSOR ZHOU YULIN

Professor Zhou Yulin

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

Professor Zhou Yulin was born is 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, a world-famous mathematician. Due to his excellent research work on quasilinear parabolic equations, he received a Candidate doctor's degree of physical and mathematical sciences there in 1957.

From Aug. 1957 when he returned to homeland to April 1960, Professor Zhou worked in the Department of Mathematics and Mechanics at Peking University, where he was the associate director of the Teaching and Research Section of Partial Differential Equation. Later he served as a vice chairman of the Institute of Applied Physics and Computational Mathematics.

Professor Zhou started academic career from studying combinatorial topology in the late 40's. He had published several papers covering the theory of homotopy, topological invariant of manifold since then, and achieved a series of excellent results. 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) The joint work with O. A. Oleinik and A. C. Kalashnikov on porous media equation[11], which was considered to be the foundation work on quasilinear degenerate parabolic equations. This paper not only gave the definition of the weak solutions, proved the existence and uniqueness of weak solutions for the Cauchy problem, Dirichlet and Neumann boundary value problems respectively, but also deeply revealed the important properties of solutions to this kind of equations, such as the finite propagation speed of disturbance, etc. For a longtime large amount of research work in this field has been conducted within the framework of this paper all around the world. This paper is still being referenced nowadays, thirty years later.

2) The 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[12][19]. As is well known, in the early 50's, the studies on general linear parabolic equations of second order had just begun. The only results on quasilinear equations were mostly concerned with the existence of local solutions; the research on the Neumann boundary value problems, even on the linear equations, had hardly ever been conducted. Professor Zhou creatively chose a proper research framework-the Rothe's method, in this dissertation, where he ingeneously gave a method of *a*