

**ON THE OCCASION OF THE SEVENTIETH
BIRTHDAY OF
PROFESSOR JIANG LISHANG**



Professor Jiang Lishang

Professor Jiang Lishang was born in Shanghai in October 1935 in a family migrated from Suzhou. He graduated from Department of Mathematics, Beijing University in 1954, and then began his teaching career at Beijing Aviation College. In the spring of 1957, he returned to Beijing University to study partial differential equations as a graduate student of Professor Zhou Yulin. He graduated in 1961 and began his teaching career at Beijing University. He later taught in Suzhou University and now is teaching at Tongji University. Between 1989 and 1996, he was the president of Suzhou University. From 2001 to 2005, he was the chairman of Shanghai Mathematical Society.

In his more than 50 years' research and teaching career, Professor Jiang has many great achievements.

In the early 1960s, Professor Jiang published a series of papers on the two-phase Stefan problem. He solved the existence of a global classical solution and the infinite differentiability of the free boundary. This result predated similar researches in other countries by 13 years. This achievement has been widely recognized as a ground breaking and pioneering work in the research of the free boundary and has exerted huge influence on the later development of the field. Since then his research results have been frequently quoted and played a fundamental role in many publications. After 1982, his collaboration with A. Friedman led to the solution of the Stefan-Signorini problem theoretically. They thoroughly investigated the structure of the solution and introduced a new way to study the control problem related to the free boundaries. On the study of the Masket problem, Professor Jiang introduced a new unknown function similar to the "saturation" which satisfies a quasi-linear hyperbolic equation from a viewpoint of Senior Engineer Chen Zhongxiang. He transferred the interface of the two replacing and replaced fluids (free boundary) into an equivalent system of "shock wave", so that he obtained the weak formula and the numerical method of Masket problem successfully. This work also started a series of follow-up researches. These outstanding works have established Professor Jiang's important position in the research of free boundary. In 1991, the project "Free Boundary Problem" led by him won the third prize of the National Natural Science Award of China.

Besides free boundary, Professor Jiang also contributed to the understanding of quasi-linear degenerate elliptic and parabolic equations (systems). In this area, he extended famous Keldysh's paper to the quasi-linear case, in which degeneration was caused by vanishing of the solutions. Under the complete natural conditions, he obtained the uniqueness of the solution and the optimal estimates. These results, as part of the project "quasi-linear degenerate elliptic and parabolic equations (systems)" had been awarded the second prize of the 1986 Science and Technology Progress by the State Education Commission in China.

Between 1979 and 1982, Professor Jiang concentrated on the research of the finite element method. He collaborated with Professor Lin Qun and gave a variational difference algorithm of a 4th order elliptic equation, independent of the related works from overseas. This result revealed the variational structure of a difference scheme of the bi-harmonic operator. They also proved the convergence of the variational difference algorithm of the ordinary Navier-Stokes equation. Professor Jiang's book "Fundamental Theory of Finite Element" was awarded the first prize of 1987 "Distinguished Teaching Book" by the State Education Commission.

Professor Jiang Lishang's contribution to sciences also lies in his great efforts on the application of the mathematics to the real physical and economic worlds. Over the decades, he has not only advocated loudly but also practiced rigorously on these applications. His research on applied mathematics extended across a great range of fields