

Preface

This festschrift volume is dedicated to Professor Youzhong Guo on the occasion of his 75th birthday and 55 years of scientific career.

Born in Hangzhou, China, on October 25, 1935, and graduated from Nanjing University of Technology in 1955, Guo was recruited to Institute of Mathematical Sciences (Wuhan), Academia Sinica, as a research assistant to work with mathematician, Professor Guoping Li, academician of Academia Sinica. Since then, Guo has been engaged in mathematical sciences research and made many achievements. He published over one hundred articles ranging in pure and applied mathematics, especially in mathematical physics, system science, and mathematical economics. Guo's influence through his publications, lectures, and services has benefited people far beyond his fields.

In 1979, Guo was appointed Professor and Executive Vice-Director of Institute of Mathematical Sciences and Chairman of the Institute's Academic Committee. In 1987, Guo was appointed Chairman of Wuhan Municipal Commission of Science and Technology and became Director of Institute for Industry and Applied Mathematics. Afterwards he was elected as Vice-Chairman of Chinese Society of Industrial and Applied Mathematics, Chairman of Rational Mechanics and Modern Mathematics Commission of Chinese Society of Mechanics. Among his other past and present positions and responsibilities are: Editor-in-Chief/Editor of Lecture Notes for Mathematics, Acta Mathematica Scientia, Structural Analysis Systems and Engineering Analysis International, Director of System Engineering Society of China.

In the 1950's, Guo contributed in the approximation theory of functions, analytical theory of differential equations, variational principles, error estimates of solutions of differential equations in the Sobolev spaces. Guo also designed Wuhan Laboratory of Electrostatic Accerlator, Academia Sinica. Taking a cooperative research task with the Academy of Sciences of Soviet Union and working with Guoping Li, Guo studied the theory and applications of automorphic functions and the Minkowski–Denjoy functions for a long time. Their results were published as the first monograph of its kind in the world in 1978.

In the 1960's, Guo worked on field theory and the Three-Gorge Project. He developed the principles of transformations of fiber bundles for general relativistic

quantum fields, known as the L-G method, which gives a new natural representation of exterior differential forms and allows much simplified calculations and analysis. He also put forward some new methods for the analysis of large scale systems, such as rheology theory of limiting equilibria, stability of side slopes, stresses in tunnels, and dynamics of blasts applied to the Three Gorges. In the so-called 'Cultural Revolution,' Academia Sinica stopped functioning, and Guo suffered ten years (1968–1978) of unjust imprisonment and stray.

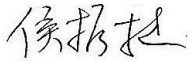
In the 1970's, under extremely difficult circumstances, Guo was ordered to complete many designs in architecture and automatic system engineering, when he was behind bars. Guo also contributed in developing the energy band theory of semi-conductors. In studying the anisotropic energy band theory and geo-dynamics based on the statistical characteristics of rock and soil, Guo established a statistical theory for rock and soil mechanics and pioneered mathematical seismology. After the Cultural Revolution, Guo was appointed to take charge of restoring and reconstructing Institute of Mathematical Sciences.

In the 1980's, focusing on nonlinear mechanism of earthquakes, Guo helped lay a mathematical foundation for structural analysis. He obtained a variational representation theory of plastic dislocation and proved an existence and uniqueness theorem in the theory of micro-elasto-visco-plasticity. He also found a mathematical formalism for saturated porous medium magneto-hydro-dynamics, corrected some major errors in electro-magnetic theory, and generated new models in seismology and bio-mechanics. Through studying asymptotic methods, Guo surprisingly proved the occurrence and propagation of global singularities in gradient problems. These achievements led to the election of Guo as a main-entry Author for Mathematical Physics, in the Great Chinese Encyclopedia.

In the 1990's, Guo was appointed Chairman of Wuhan Commission of Science and Technology and Director of Wuhan Institute for Industrial and Applied Mathematics. Then he was elected Vice Mayor of Wuhan City and exerted all his energy to the development of the local economy, education, and science. Being responsible for high-tech sectors, he always made his best effort in raising the living standard of the urban poor and developing the human resources in a scientific, practical, and persistent way. He helped to establish a new university, Jiangnan University, through a decade-long tireless work. Within his tenure, the East-Lake High-Tech Development Zone was approved by the Central Government which was then listed as number one among its peers.

At the beginning of 2000, Guo was appointed to lead the national project, the Strategy Research for Central China Economic District Along Yangtze River, with a research group comprised of 12 academicians, 36 professors, and 38 young researchers. Jointly, they investigated this rapidly developing district and the river economy systematically, resulting in the publication of a series of 10 Evolution Economics research volumes to advise China's Central Government.

I would like to take this opportunity to wish Youzhong many more successes in his career and a long healthy life.



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February 12, 2009