Preface

It was the year of 1979 when Yi Lin, the first author of this book, was a sophomore in college majoring in Mathematics. According to the requirement of the national Department of Education he took 23 credit hours for each of the semesters in the university so that he had a chance to experience quite a few professors of varied characters. Although still not clear about what the future held for him in that career path, the different teaching styles and personalities of the professors made him feel curious about what a successful mathematician really did in his or her career. To satisfy this curiosity, he spent the winter break of that year on Morris Kline's wonderful book, "Mathematical Thoughts from Ancient to Modern Times," (Oxford university Press, 1972). Through additional readings along similar lines in the following years, he realized among many other facts that natural science, in particular, physics was an "exact" science because of Newton's laws of motion and that social science was not nearly as "exact" as natural science due to the absence of similar laws.

As he was soon greatly influenced by the teaching of Shutang Wang, a general topologist, and inspired by a paper by George Klir, a well-known scholar in systems science, Yi Lin started his professional career in systems research hoping that one day he could have the luck to introduce the badly needed laws for social science or maybe such laws that could make both natural and social sciences exact at the same time.

During the two years before the publication of his edited volume, entitled "Mystery of Nonlinearity and Lorenz's Chaos," in 1998 by Kybernetes, the International Journal of Cybernetics and Systems, as a double special issue, the idea of a spinning system began to germinate in his head. However, there were still a lot of holes in the thinking. Along with the successful publication of the said volume, well over a thousand communications from scholars from all over the world helped him to crystallize his idea and finally a three-dimensional visualization of the model was placed on the front cover of his 2002 book (joint with Y. Wu), entitled "Beyond Nonstructural Quantitative Analysis: Blown-Ups, Spinning Currents and the Modern Science," published by World Scientific.

In 2008 Yi Lin successfully finalized the perceived spinning systemic model and named it (Chinese) yoyo due to its general shape in the three-dimensional space in the highly regarded paper, "Systemic yoyo model and applications in Newton's, Kepler's laws, etc.," (Kybernetes: the International Journal of Cybernetics, Systems and Management Science, vol. 36, no 3–4, pp. 484–516). As what had been dreamed about for many years, in this paper, Lin employed this new model of systems to generalize Newton's laws of motion into four laws on the state of motion of general materials. After that he walked through Kepler's laws of planetary motion, Newton's law of universal gravitation, and provided a brand new explanation for why planets travel along elliptical orbits, why no external forces are needed (in the traditional science, external forces are always needed) for celestial systems to resolve about one another, and why binary star system, tri-nary star systems, and even n-ary star systems can exist in the physical reality, for any natural number $n \geq 2$.

Continuing on this initial success, Yi Lin joined hands with a colleague to apply this model to the study of economics, a part of social science, by first proving a sufficient and necessary condition under which Becker's rotten kid theorem (a piece of Nobel Prize winning work in Economics) holds true in general (Y. Lin and D. Forrest (2008). Economic yoyos and Becker's rotten kid theorem. Kybernetes: The International Journal of Cybernetics, Systems and Management Science, vol. 37, no. 2, pp. 297 - 314). With the joint hands in the research team of Wujia Zhu, Ningshen Gong, and Guoping Du, Yi Lin published an edited volume in 2008 as a special double issue in Kybernetes (vol. 37, nos. 3–4, pp. 387–578), entitled "Systematic Studies: the Infinity Problem in Modern Mathematics." In this issue, the yoyo model is successfully applied to the study of human thoughts, leading to the discovery of the fourth crisis in the foundations of mathematics. Additionally, these four authors clearly prove that by distinguishing the concepts of actual and potential infinities, the second and the third crises of the past of the foundations of mathematics were not really resolved as historically believed.

What had been achieved in classical physics, the study of the three-body problem, the Becker's rotten kid theorem, and the foundation of mathematics convincingly reveals to Yi Lin and his colleagues the following fact. In the past 80 some years, the difficulty experienced in the research of systems science and the relevant low progress are mainly due to the lack of a convenient intuition and a common playground on which important scientific conclusions on general systems could be established. In particular, in the investigation of systems, there is an urgent need to develop a model similar to that of the Cartesian coordinate system available for modern science, all magnificent results of which are established on the Cartesian coordinate system. In 2008, Yi Lin provided a systematic presentation of all the results related to the yoyo model and its applications in nonlinear science, classical physics, corporate governance, household economics, child labor, foundations of mathematics, and practical civil engineering project design, and the prediction of (nearly) zero probability disastrous natural events, in his monograph "Systemic Yoyos: some Impacts of the Second Dimension," published

by Auerbach Publications, an imprint of Taylor and Francis. That is, what is shown in this monograph is that with the systemic yoyo model well established, the research of general systems can truly take its hold as the second dimension of science, as argued by George Klir in the early 1990s (Facets of Systems Science, Springer, New York, NY), with the traditional science as the first dimension.

Riding on the previous successes with the systemic yoyo model, Yi Lin joined hands with Bailey Forrest to explore the possibility of applying the laws on state of motion of general materials to the study of humans and their organizations of different scales. Different from the conventional studies in social science, where statistics has been the tool of analysis so that only organizations of small scales could potentially be considered with relatively reliable results derived, what is presented in this book provides a brand new approach to the investigation of human organization of any magnitude. With the conclusions derived thereafter, statistics will be potentially usable for reconfirming whatever theoretical results established using the systemic yoyo methodology, if adequate and meaningful data could be collected.

It is our hope that you will benefit from reading this book and referencing this book time and again in your professional endeavors. At the same time we would love to hear from you no matter what your comments or suggestions might be. Yi Lin, the first author, can be reached at either Jeffrey.forrest@sru.edu or Jeffrey.forrest@iigss.net.

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