

Preface

It was just fifty years ago when one of the first chaos attractors was recorded diagrammatically and scientifically as an output of an analogue computer here at this campus of Kyoto University in the same November of 1961 by a graduate student of Electrical Engineering, Mr (now Professor Emeritus) Yoshisuke Ueda, who had been working for PhD. Together with late Professor Edward N. Lorenz, both of them (one in electrical engineering and one in atmospheric science) are regarded as pioneers of chaos study. However, the phenomena they observed were very strange at their times. Lorenz (1963) called the phenomenon as *Deterministic Nonperiodic Flow*, while Ueda (1971) called it *Randomly Transitional Phenomena*. In mathematical study of nonlinear dynamics, the strange phenomena were captured by the mapping of Smale's *Horseshoe* and symbolic dynamics (1965). The attractors in the phase space, which give rise the phenomena, was given a new name *Strange Attractor* by David Ruelle and Floris Takens (1970). Naming the strange phenomenon itself with a compact neat term was not until 1975 of *Period Three Implies Chaos* by Li Tien-Yien and James A. York.

In the last four decades, we have had an increasing amount of interest in this field and researches in many different domains of science. In view of its historical importance of chaos study, we proposed an IUTAM Symposium on *50 Years of Chaos* at the IUTAM General Assembly held at Adelaide in 2008. Now in 2011 after fifty years, it is anticipated that quite a new innovative idea can be found in this volume.

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