Preface

Mechanics: The well-spring of mathematics (volume 2)

This volume contains a set of papers in mathematical and numerical analysis; the common theme to all the papers in the volume is their relevance to applications to problems in mechanics. The volume contains papers by experts in the field of mathematical analysis and achieves a good balance between papers devoted to analytical and numerical issues concerning the mathematical properties of problems related to various aspects of mechanics. The papers investigate rigorous mathematical issues concerning a wide range of questions that are relevant to the mechanics of the classical Navier–Stokes fluid, non-Newtonian fluids, field dependent fluids and biological systems. The special volume also contains papers that address more general issues concerning solutions to partial differential equations. The wide varieties of problems that are presented emphasize the fact that physics has always been and will continue to be the well-spring of mathematics. As von Neumann aptly observes “As a mathematical discipline travels far from its empirical source, or still more, if it is a second or third generation only indirectly inspired by ideas coming from “reality”, it is beset with very grave dangers. It becomes more and more purely aestheticizing, more and more purely l’art pour l’art. This need not be bad, if the field is surrounded by correlated subjects, which still have closer empirical connections, or if the discipline is under the influence of men with an exceptionally well-developed taste. But there is a grave danger that the subject will develop along the line of least resistance, that the stream, so far from its source, will separate into a multitude of insignificant branches, and that the discipline will become a disorganized mass of details and complexities. In other words, at a great distance from its empirical source, or after much “abstract” inbreeding, a mathematical subject is in danger of degeneration”.

We hope that the reader will find the papers in the special issue as enlightening and informative as we found them to be.

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13 September 2005

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