The Princeton Companion to Applied Mathematics, Edited by Nicholas J. Higham, Associate Editors: Mark R. Dennis, Paul Glendinning, Paul A. Martin, Fadil Santosa and Jared Tanner, Princeton University Press, Princeton, NJ, 2015, xvii + 994 pp, ISBN: 978-0-691-15039-0/hbk; 978-1-4008-7447-7/ebook.

As the editor writes in the Preface "*The Princeton Companion to Applied Mathematics* describes what applied mathematics is about, why it is important, its connections with other disciplines, and some of the main areas of current research." We also reproduce here the nice words of Paul Halmos quoted in Editor's (NJH) article *What is applied mathematics*?

> Pure mathematics can be practically useful and applied mathematics can be artistically elegant... Just as pure mathematics can be useful, applied mathematics can be more beautifully useless than is sometimes recognized...

On the other side, it is not easy to give a precise definition of applied mathematics and, in some cases, it is difficult to say whether a specific domain (or topic) belongs to pure or to applied mathematics. Also, over time, a domain of pure mathematics finds its applications, as, e.g., the applications of number theory to cryptography. Pure mathematics was presented in another Princeton volume *The Princeton companion to mathematics* (Editors: Timothy Gowers, June Barrow-Green, Imre Leader; Princeton University Press, 2008), which contains some topics (Mathematics and Chemistry, Mathematical Biology, Mathematical Statistics, Optimization and Lagrange Multipliers) which can be considered to belong to applied mathematics and could be included in the present volume as well. In order to avoid overlapping the topics presented in the previous Companion are excluded from the present one, and in the case of some crucial concepts (e.g. algebraic geometry, fast Fourier transform), the approach here is different, with emphasis on applications and computational aspects. In some cases, particular aspects of topics treated in the previous companion are included here.

The book is divided into eight parts.

Part I, *Introduction to Applied Mathematics*, contains some general results about applied mathematics as: what is it, the language, algorithms, goals and history.

Part II, *Concepts*, contains short articles explaining specific concepts as convexity, chaos, floating-point arithmetic, Markov chains, etc. This part is not a comprehensive, other concepts being presented in other articles.

Part III, *Equations, Laws, and Functions of Applied Mathematics*, contains short presentations of some functions and equations encountered in applied mathematics, as, e.g., Bessel functions, Mathieu functions, Euler functions, Black-Scholes law, Hooke's law, the equations of Cauchy-Riemann, Laplace, Korteweg-de Vries, Dirac, etc.

Part IV, *Areas of Applied Mathematics*, contains longer articles giving an overview of some domains of applied mathematics as complex analysis, ordinary and partial differential equations, data mining, random matrices, control theory, information theory, etc.

Part V, *Modeling*, presents some mathematical models in chemistry, biology, financial mathematics, wheather prediction, etc.

Part VI, *Example Problems*, contains short articles on various interesting problems as bubbles, foams, the inverted pendulum, robotics, random number generation, etc.

Part VII, *Application Areas* contains articles on connections of mathematics with other domains as aircraft noise, social networks, chip design, digital imaging, medical imaging, radar imaging, etc.

The final part, VIII, *Final Perspectives*, contains some longer articles of general interest on mathematical writing, the reading of mathematical papers, teaching applied mathematics, mathematics in the media, mathematics and policy (how mathematicians can influence political decisions).

In the last years, partly due to high performance computers, the area of applied mathematics enlarged considerably, so that the present volume is a welcome addition to the existing publications and a guide for the researchers interested to apply mathematics in their domains (an unavoidable option, as it can be seen).

Together with its elder brother, *The Princeton companion to mathematics*, which turned to be a very successful enterprise, the present volume covers a lot of topics in applied mathematics, and surely it will also have great success and impact. It is dedicated to students (starting with the undergraduate level), teachers, researchers in various areas and specialists in various domains desiring to know what mathematics can offer and, as it is proved in this volume, it has a lot to offer.

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