Mesure et intégration

E. PAP, (Editor). — **Handbook of measure theory**. — Deux vol. reliés, 17×25, de XI, 1607 p. — ISBN 0-444-50263-7 (vol. 1+2). — Prix: €260.00. — Elsevier, Amsterdam, 2002.

The main goal of this handbook is to survey measure theory with its many different branches and its relations with other areas of mathematics. Mostly aggregating many classical branches of measure theory, the aim of the handbook is also to cover new fields, approaches and applications which support the idea of "measure" in a wider sense, e.g. the ninth part of the handbook. Although chapters are written of surveys in the various areas, they contain many special topics and challenging problems valuable for experts and rich sources of inspiration. Mathematicians from other areas as well as physicists, computer scientists, engineers and econometrists will find useful results and powerful methods for their research. The reader may find in the handbook many close relations to other mathematical areas: real analysis, probability theory, statistics, ergodic theory, functional analysis, potential theory, topology, set theory, geometry, differential equations, optimization, variational analysis, decision making and others. The handbook is a rich source of relevant references to articles, books and lecture notes and it contains for the reader's convenience an extensive subject and author index. — *Contents:* Classical measure theory. — Vector measures. — Integration theory. — Topological aspects of measure theory. — Order and measure theory. — Geometric measure theory. — Relation to transformation and duality. — Relation to the foundations of mathematics. — Non-additive measures.

Fonctions d'une variable complexe

R. KÜHNAU, (Editor). — **Handbook of complex analysis, vol. 1: Geometric function theory.** — Un vol. relié, 17×24,5, de XII, 536 p. — ISBN 0-444-82845-1. — Prix: €135.00. — Elsevier, Amsterdam, 2002.

Geometric function theory is a central part of complex analysis (one complex variable). The *Geometric Function Theory* volume deals with this field and its many ramifications and relations to other areas of mathematics and physics. The theory of conformal and quasiconformal mappings plays a central role in this handbook, for example a priori estimates for these mappings which arise from solving extremal problems, and constructive methods are considered. As a new field the theory of circle packings which goes back to P. Koebe is included. The handbook should be useful for experts as well as for mathematicians working in other areas, as well as for physicists and engineers.

Terry SHEIL-SMALL. — **Complex polynomials.** — Cambridge studies in advanced mathematics, vol. 75. — Un vol. relié, 16×24, de XVIII, 428 p. — ISBN 0-521-40068-6. — Prix: £65.00. —Cambridge University Press, Cambridge, 2002.

This book studies the geometric theory of polynomials and rational functions in the plane. Any theory in the plane should make full use of the complex numbers and thus the early chapters build the foundations of complex variable theory, melding together ideas from algebra, topology and analysis. In fact, throughout the book, the author introduces a variety of ideas and constructs theories around them, incorporating much of the classical theory of polynomials as he proceeds. These ideas are used to study a number of unsolved problems, bearing in mind that such problems indicate the current limitations of our knowledge and present challenges for the

future. However, theories also lead to solutions of some problems and several such solutions are given including a comprehensive account of the geometric convolution theory.

Claude WAGSCHAL. — **Fonctions holomorphes. Équations différentielles: exercices corrigés.** — Collection méthodes. — Un vol. broché, 15×22, de XVII, 457 p. — ISBN 2-7056-6456-4. — Prix: € 40.00. — Hermann, Paris, 2003.

Le premier chapitre de cet ouvrage est consacré à la théorie des fonctions holomorphes, essentiellement d'une variable complexe. On y trouvera un exposé des notions de topologie algébrique (homotopie, revêtement, etc.) indispensables pour comprendre certains aspects de cette théorie, en particulier tout ce qui se rattache au prolongement analytique. Il comporte également de très nombreux exercices de difficulté variable dont les solutions sont données en fin de chapitre. Le second chapitre est une introduction à la théorie des équations différentielles, aussi bien dans le champ réel que dans le domaine complexe. On aborde en particulier l'étude des équations différentielles à points singuliers réguliers: théorème de Fuchs, théorèmes d'indice (Komatsu-Malgrange). On y traite également des équations aux dérivées partielles du premier ordre dont la résolution se réduit à celle de leur système caractéristique (méthodes de Cauchy) et, enfin, on résout le problème de Cauchy pour des équations aux dérivées partielles holomorphes d'ordre supérieur (théorème de Cauchy-Kowalevsky).

Equations différentielles ordinaires

Valerii I. GROMAK, Ilpo LAINE, Shun SHIMOMURA. — **Painlevé differential equations in the complex plane.** — De Gruyter studies in mathematics, vol. 28. — Un vol. relié, 18×24,5, de VIII, 303 p. — ISBN 3-11-017379-4. — Prix: € 82.24. — Walter de Gruyter, Berlin, 2002.

This book is the first comprehensive treatment of the matter. Starting with a rigorous presentation for the meromorphic nature of their solutions, the Nevanlinna theory will be applied to offer a detailed exposition of growth aspects and value distribution of Painlevé transcendents. The subsequent main part of the book is devoted to topics of classical background such as representations and expansions of solutions, solutions of special type like rational and special transcendental solutions, Bäcklund transformations and higher order analogues, treated separately for each of these six equations. The final chapter offers a short overview of applications of Painlevé equations, including an introduction to their discrete counterparts.

Systèmes dynamiques et théorie ergodique

John BANKS, Valentina DRAGAN, Arthur JONES. — **Chaos: a mathematical introduction.** — Australian Mathematical Society lecture series, vol. 18. — Un vol. broché, 15×23, de XI, 294 p. — ISBN 0-521-53104-7. — Prix: £ 27.95. — Cambridge University Press, Cambridge, 2003.

When new ideas such as chaos first move into the mathematical limelight, the early textbooks tend to be very difficult. The concepts are new and it takes time to find ways to present them in a form digestible to the average student. This process may take a generation, but eventually, what originally seemed far too advanced for all but the most mathematically sophisticated becomes accessible to a much wider readership. This book takes major steps along that path of generational change. It presents ideas about chaos in discrete time dynamics in a form that should be accessible to anyone who has taken a first course in undergraduate calculus. More remarkably, it manages to do so without discarding a commitment to mathematical substance and rigour.