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BOOK REVIEWS *RECENZII*

A.W. AMBERGEN, *Statistical Uncertainties in Posterior Probabilities,* CWI TRACT 93, Amsterdam, 1993, iv+129 pg., ISBN 90-6-196-422-9.

Volumul 93 al cunoscutei serii de monografii matematice, o ediţie îmbunătăţită a tezei de doctorat a autorului, este consacrat aspectelor statistice ale teoriei clasificării. Sunt studiate probleme privind probabilitatea de apartenenţă a unui element la o clasă dintr-un sistem prestabilit de clase. Se consideră că obiectele unei investiţii pot proveni din k populaţii, $k \neq 2$. Prin înregistrarea a p măsurători se obţine un vector p -dimensional numit scor, x. Acesta este interpretat ca o valoare posibilă a unui vector aleator X şi se consideră probabilităţile ca un obiect arbitrar să aparţină claselor, condiţionate de $X = x$.

După prezentarea modelului general, se face un istoric al problemei şi se tratează apoi chestiuni privind derivarea distribuţiei asimptotice a estimatorului vectorului probabilităţilor aposteriorice, erorile standard ale probabilităţilor aposteriorice în procese de decizie, aproximări Bayesiene, probleme variate privind densitatea normală, aplicaţii şi probleme de simulare. Volumul se încheie cu o listă bibliografică bogată , un indice de autori şi un index alfabetic. Lucrarea interesează pe cei ce se preocupă de statistica matematică , teoria clasificării şi inteligenţa artificială.

Petru Minuţ

ROLF BIEHLER, ROLAND W. SCHOLZ, RUDOLF STRASSER, BERNARD WINKELMANN, *Didactics of mathematics as a scientific discipline,* Mathematics Education Library, vol.13, Kluwer Academic Publishers, Dordrecht, Boston, London, 1994, IX + 467., US $ 150.00, ISBN 0-7923-2613-X.

Didactics of Mathematics is hard recognized as a separate scientific discipline, independent from mathematics or educational sciences mainly because of a weak communication on the researches in this field. Much work was done in isolation, with a variety of methodologies and strongly influenced by local curricula.

This book is a first step to stating the Didactics of Mathematics as e new branch of sciences. Beside a general perspective on Didactics of Mathematics, an important idea of the editors was to identify certain subdisciplines and to suggest an overall structure of its field of research. Then they call for papers to cover these subdisciplines and so they have got 30 original contributions from 10 countries.

Each chapter is opened with a synthesis, written by an editor, providing an orientation for the research domain represented by the contributions which follow. The following chapters will find: 1.Preparing Mathematics for Students; 2.Teacher Education and Research on Teaching; 3.Interaction in the Classroom; 4.Technology and Mathematics Education; 5.Psychology of Mathematical Thinking; 6.Differential Didactics; 7.History and Epistemolgy of Mathematics and Mathematics Education; 8.Cultural Framing of Teaching and Learning Mathematic. The first five chapters are widely accepted as subdisciplines. The other three propose subdisciplines which seems to be less well-structured up to now. The term "Differential Didactics" was invented in analogy to "Differential Psychology" in order to create a focus for research on gender, cultural minorities, and different groups of learners.

The book places more emphasis on a variety and multiplicity of perspectivies then an authorative synthesis from one author's point of view. It offers a system of objects, methodologies and criteria for valid knowledges of a large consesus.

This book is of interest to all researchers in the field of Didactics of Mathematics. It can be also used by mathematics educators, teacher trainers, teachers of mathematics and by all people interested in neighbouring disciplines. Each contribution ends with a representative bibliography. A list of authors and a subject index complete this very interesting and useful book which occasion was two aniversaries: 20 years of work at the Institute fur Didaktik der Mathematik (IDM), Bielefeld University and Professor Hans Georg Steiner's 65 th birthday on November 21, 1993.

We strongly recommend this book to all people who in a way or another are connected with Mathematics.

Mihai Anastasiei

GERARD HUET, GORDON PLOTKIN (Eds.), *Logical Frameworks*, Cambridge University Press, 1991, xii+403 pp, ISBN 0-521-41300-1.

The book is a collection of papers presented at the first annual Workshop on "Logical Frameworks: Design, Implementation and Experiment" (Sophia - Antipolis, France, May, 1990). When considering the impact logic - computing, these frameworks may arise in a number of ways. First, many logics are of interest in Computer Science and a "general" single, implementable, meta - logic in which all these can be "represented", would be helpful. In the second sense, there is direct computational content, and also the need for a particular descriptive apparatus in any fixed logic, which may form a basis for general conclusions. Finaly, purely logical questions may arise from these issues. Consequently, the papers are grouped into six illustrative themes:

(I). **Frameworks.** Different logical frameworks are analyzed. "Proposition" and "truth" are fundamental and they are used to explain notations as type or elemthood.

(II). **Implementations.** Practical experience in the implementations of type theories is descriebed (Nuprl, GTS, Elf).

(III). **Formal systems.** This theme is in fact concerned with represatations of formular systems one into another (encoding operational semantics definitions in L.F; translation of LF into a fragment of higerorder logic implemented in λ Prolog).

(IV). **Type theories.** New issues for typed λ -calculus and Martin - Löf's type theories are pointed out.

(V). **Proofs and computations.**Proofs are viewed as terms and formulas as types, in the sense of the Curry - Howard correspondance. The main problems treated are: automated proof search in $\lambda\pi$ - calculus, and some contructive refinaments of classical logics.

(VI). **Logical issues.** Provides answers to (new) naturally arising logical questions.

The book is very "dense", and represents a valuable tool for anybody involved with logic and computation.

C. Masalagiu

G.H. GOLUB, C.F. VAN LOAN, *Matrix Computations,* The Johns Hopkins University Press, Baltimore and London, 1989, XIX + 642 p., $ 34.50.

Aflată la a doua ediţie, cartea abordează calculul matriceal din cele mai diverse puncte de vedere. După o introducere a tehnicilor şi algoritmilor de bază , sunt tratate chestiuni de ortogonalitate, sisteme liniare, factorizare, metoda celor mai mici pătrate, valori proprii. Un capitol special conţine o trecere în revistă a unor algoritmi paraleli în calculul matriceal.

Costel Radu

C. KIRCHNER (Ed.) - *Unification,* Academic Press Limited, 1990, 604 p., ISBN 0-12-409590-9.

The volume *Unification* collects 19 papers devoted to unification theory and which appeared on the Journal of Symbolic Computation - 1989. The variety of areas in computer science which applies the unification theory grows very much in the last years. It includes databases, information retrieval, computer vision, natural language processing, knowledge representation, logic programming, term rewriting systems, validity in algebras, nonclassical logics etc. By including of the most recent contributions (up to that moment) and covering main topics in the field, the volume under review constitutes an excellent worktool. The workers in the field will find here new starting points for further researches and the specialists from other fields which apply the unification will find here the information required.

Here is the list of the papers included in the volume.

J.H. SIEKMANN - *Unification theory.* This paper contains a rich list of bibliografic references.

H.-J. BÜRCKERT, et al. - *On equational Theories.*

M.SCHMIDT - SCHAUSS - *Unification in permutative equational theories is undecidable.*

H.J. BÜRCKERT - *Matching: A special case of unification ?*

P.C. KANELLAKIS et al. - *On the relationship of congruence closure and unification.*

P.Le CHENADEC - *On the logic of unification.*

M. SCHMIDT - SCHAUSS - *Unification in a combination of arbitrary disjoint equational theories.*

A. BOUDET et al. - *Unification in boolean rings and abelian groups.*

H. COMON et al. - *Equational problems and disunification.*

H. ABDULRAB et al. - *Solving word equations.*

M. CLAUSEN et al. - *Efficient solution of linear deophantine equations.*

P. LINCOLN et al. - *Adventures in associative - commutative unification.*

F. BAADER - *Unification in commutative theories.*

U. MARTIN et al. - *Boolean unification - The story so fun.*

J. MESEGUER et. al. - *Order - Sorted unification.*

G. SMOLKA et. al. - *Inheritance hierarchies: semantics and unification.*

W. NUTT et al. - *Basic narrowing revisited.*

J.-H. YOU - *Enumerating outer narrowing derivations for constructor - based term rewriting systems.*

W. SNYDER et. al. - *Higher - order unification revisited: complete sets of transformation.*

D. Lucanu

M. WIRSING, J.A.BERGSTRA (Eds.) - *Algebraic Methods: Theory, Tools and Applications,* Lecture Notes in Computer Science, Springer-Verlag Berlin, Heidelberg, 1989, IV + 558 p.

The book under review contains a part of the contribution which were presented at the workshop on "Algebraic Methods: Theory, Tools and Aplications" which has help on June 9 - 11, 1987 in Passau, Germany. The scope of the workshop, which was organized by the METEOR project authors, was to discuss the use of the algebraic techniques for the systematic contruction of software. The book includes 4 invited contributions and 13 technical reports which were divided into four parts. The first part deals with different aspects of algebraic specification and includes all the four invited contributions and a technical report. In the second part the design language COLD is presented. This language is used for describing and development of software systems. The third part presents experiences with the RAP system, a system for analyzing, testing and executing algebraic specification. A contribution of this part describes the RAP system. The last part is devoted to the algebraic treatment of communicating processes. The three papers included in this part focus around the approach of Burgstra and Klop to process algebra.

Here is the list of the invited contributions:

H. PARTSCH - *Algebraic specification: A step towards future software engineering.*

H. KLAEREN, K. INDEMARK - *Efficient implementation of an algebraic specification language.*

E. ASTESIANO, A. GIOVINI, G. REGGIO, E. ZUCCA - *An integrated algebraic approach to the specification of data types, processes and objects.*

H. REICHEL - *Software specification by behavioural canons.*

D.Lucanu

ALAN BADDELEY, NIELS OLE BERNSEN (Eds.) - *Research directions in cognitive science: european perspectives,* Lawrence Erlbaum Associates Publishers.

This is a series of five volumes worked out by a joint European study during 1987 - 1988 which was funded by the Commission of the European Communities. There were involved scientists from the areas of cognitive psycology, logic and linguistics, cognitive neuroscience, human - computer intercetion and artificial intelligence.

The idea was to realize a prospective mapping of research problems in cognitive science to be addressed over the next years.

The two main themes envisioned by the authors are:

1. integration of theory, computer models, and actual working implementations, and

2. real - work validity of theories, models and applications. We received the following volumes of this series:

Vol 1, 1989, Cognitive Psichology:
Main subjects: humain vision and cognitive science, auditory preprocessing and recognition of speech, learning and memory, problem solving, reasoning and decision making, research issues in psycholinguistics, experimentation and computation in cognitive science.

Vol 3, 1991, Human - Computer Interaction:
The information proccesing perspective in user modelling, human - computer interaction from the viewpoint of individual differences and human learning, analysis and models of opertors'activities in complex natural life environments, the suport of cognitive capacity in future organisation.

Vol 4, 1991, Cognitive Neuroscience:
Neuroscience in the context of cognitive science and artificial intelligence, vision as an information processing product, brain mechanism in the perception and control of movement, the brain as a coherent and self - organising systems, curent trends in human neuropsychology, new research trends in cortical control of movements, research directions in the neural basis of memory, pain research as an interdisciplinary challenge.

Liviu Ciortuz