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The above list has been compiled by using information contained in various membership lists, in mathematical journals where the affiliation of the authors is shown, or information conveyed by some of our colleagues. In order to keep-up with further changes, and update the list accordingly, we kindly ask the cooperation of the readers.

RECENT Ph D THESES DEFENDED

Hari Bercovici: "The Structure of C_0 Operators"

Dissertation submitted for obtaining the degree of Doctor of Philosophy (Mathematics), The University of Michigan, June 1982.

Doctoral Committee

Professor Carl M. Pearcy, Chairman
Professor Ciprian Foias, Indiana University
Professor Allen L. Shields
Professor B. Alan Taylor
Professor Wei-Hsuin Yang

ABSTRACT

This work is part of a larger project which consists in an exposition of all the major results obtained for the class of C_0 operators. An operator T acting on a Hilbert space belongs to the class C_0 if it is a completely nonunitary contraction ($\|T\| \leq 1$ and none of the restrictions of T is unitary) and $u(T) = 0$ for some bounded analytic function u in the unit disc.

In this work we restrict ourselves to those parts of the theory of C_0 operators in which the general model theory of Sz.-Nagy and C. Foias is not needed. In particular, Section 1 of Chapter I may be considered as an introduction to canonical model theory via a very elementary class of operators. In the remaining sections of this chapter we introduce the class C_0 and study its elementary properties.

Chapter II concerns the quasisimilarity classification theorem for operators of class C_0 (quasisimilarity is an equivalence relation for operators, weaker than similarity). This classification theorem is similar in many ways to the classical theory of Jordan, concerning operators on finite dimensional spaces, but it is blended with elements of the multiplicity theory for normal operators.

In Chapter III we give various applications of the structure theorem for operators of class C_0. Here we study the relations between the various algebras

related with a given operator of class C_0. We also consider the reflexivity of C_0 operators, and their lattices of hyperinvariant subspaces.

The Appendix is dedicated to a historical sketch of those parts of the theory of C_0 operators that are covered in this work. In particular the author's contributions to the subject are singled out.

Tudor Ratiu: "Euler-Poisson Equations on Lie Algebras and the N-Dimensional Heavy Rigid Body"

Dissertation submitted at the University of California at Berkeley, June 1980.

Thesis advisor: Professor Jerrold Mardsen

Thesis Committee: Professor Jerrold Mardsen
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ABSTRACT

The classical Euler-Poisson equations describing the motion of a heavy rigid body about a fixed point are generalized to arbitrary Lie algebras as Hamiltonian systems on coadjoint orbits of a tangent bundle Lie group. The N-dimensional Lagrange and symmetric heavy top are thereby shown to be completely integrable.

An extended abstract of the thesis has been published in the Proc. Nat'l. Acad. Sci. USA, Vol. 78 (1981), 1327-1328.

Adrian Rezus: "Lambda-Conversion and Logic"

Ph.D. Dissertation: Rijksuniversiteit, Utrecht, June 1981.

Supervised by Professor Dr. Dirk van Dalen ("promotor") and Dr. H. P. Barendregt ("advisor"): Mathematisch Instituut and Centrale Interfaculteit, Rijksuniversiteit, Utrecht, The Netherlands.

ABSTRACT

This thesis is intended to re-consider, in a modern setting, the foundational aspects of the theories of lambda-conversion and the corresponding combinatory variants as originally proposed and worked out within the Church school (A. Chruch, S. C. Kleene, J. B. Rosser and, incidentally, A. M. Turing) in the thirties.

The material is divided into seven Chapters and an Appendix.

Chapter I (Lambda-terms) is a brief introduction into the grammar of lambda-terms. (A set Λ_+ of lambda-terms is the least set containing a denumerably infinite set of variables, a possibly empty set of constants such that it is closed under application and Church lambda-abstraction; so $\lambda x.a$ is well-formed if x is free in a.)

Chapter II (Calculi of Lambda-conversion) is concerned with the presentation of several relational structures defined on sets of lambda-terms. Each such a structure (called lambda-calculus) has the form $\underline{\lambda} = (\Lambda_+, R, R^\wedge, =_R)$, where Λ_+ is a set of lambda-terms, while $R, R^\wedge$ and $=_R$, are binary relations on its carrier, called resp. contraction, reducibility and convertibility in $\underline{\lambda}$ such that $F^\wedge$ is the transitive closure of R, and $=_R$ is the least equivalence extending R. The main results established here are about the convertibility relations and can be summarized by saying that $=_R$ in some $\underline{\lambda}$ is non-universal on Λ_+ (i.e., it is not the cartesian product $\Lambda_+ \times \Lambda_+$). This amounts to a kind of consistency proof for formal systems (Rosser combinatory logics, III.5, that can be suitably interpreted in such structures. The method employed to establish this type of result consists of showing first that the corresponding reducibility relations have the so-called Church-Rosser property (cf. Trans. Amer. Math. Soc., 39, 1936, pp. 472-482). The latter facts are obtained along some uniform procedure, very close to a proof of cut-elimination in Gentzen-style ("sequent") formal systems, following a suggestion due to W. Tait and P. Martin-Löf.

The Church-Kleene lambda-calculus $\lambda\beta$ and its extensional version are studied in II.2 and II.3. Two new calculi of lambda-conversion (in fact, substructures of $\lambda\beta$) are introduced: (1) a Weak lambda-calculus λo (II.1) intended to analyse the concept of weak reduction on the basis of lambda-conversion (on suggestions of W. Howard and R. Hindley) and (2) a Modal lambda-calculus $\lambda\varepsilon$ (proposed by the author in 1979; cf. Bulletin EATCS, 11, 1980, p. 143).
λo blocks the principle of "weak extensionality" while $\lambda\varepsilon$ forbids the formulation of the usual principles of "extensionality" (for terminology see H. Barendregt, The Lambda Calculus, Its Syntax and Semantics, North Holland, Amsterdam, etc., 1981). Finally, $\lambda\varepsilon$ is of some interest in the proof-theoretic analysis of the Logic of Pure Entailment of A. R. Anderson and N. D. Belnap Jr. (J. Symbolic Logic, 27, 1962, pp. 19-52)

Chapter III (Rosser Combinatory Systems) gives an alternative ("combinatory") presentation of the relational structures λo and $\lambda\beta$ where any considerations about abstraction, viewed as a primitive notion in Chapter II, can be dispensed with. Actually, the behaviour of (Church lambda-) abstraction with respect to the convertibility relations in λo and $\lambda\beta$ is "simulated" within the new structures in terms of the basic Rosser-combinators $\hat{I},\hat{B},\hat{C},\hat{S}$ and combinatory application such that the resulting presentations do not involve essential use of bound variables any more. The structures investigated here are, strictly speaking, congruences on sets of Rosser terms, relative to combinatory application. Thus a minimal Rosser combinatory structure R_o is examined in III.1, while the combinatory analogue R_β of $\lambda\beta$ is given a new axiomatization in III.2 (alternative to that of Rosser; cf. Annals of Math. (2), 36, 1935, pp. 127-150 and Duke Mathe. J., 1, 1935, 329-355). Formal systems (Rosser combinatory logics) that can be interpreted in λo, $\lambda\beta$ are introduced in III.3.

Chapter IV (Lambda-definability and Numeral Systems) is intended to stress one of the main uses of the Church-Kleene lambda-calculus, viz., that of providing a natural set up for the formulation of the Ordinary Recursion Theory. Specifically, one is concerned with establishing an appropriate set of conditions guaranteeing the representability of the partial recursive functions with respect to infinite sets of pairwise non-convertible lambda-terms in normal form (numeral systems). It turns out that there are denumerably infinitely many distinct representations for the

underlying numerals (adequate numeral systems) in $\lambda\beta$, $\lambda\varepsilon$, while, formerly, only one such example (for $\lambda\beta$, viz. Church's "positive" numerals) was widely known in the literature, in contrast with the proliferation of such examples for the Schonfinkel-Curry lambda-calculi and their combinatory variants (see H. Barendregt, op. cit. and the Appendix of the present dissertation). In IV.8 it is shown that the Church-Kleene lambda-calculus contains less means than needed for a "type-free" formalization of the classical propositional logic, due to its relatively weak "discrimination power". This motivates the study of some appropriate extension of $\lambda\beta$ in the sequel of this work.

Chapter V (Delta-conversion) introduces a variant of Church's Calculus of delta-conversion (cf. Proc. Nat. Acad. Sci. U.S.A., 21, 1935, pp. 275-281) which extends $\lambda\beta$ by Church's delta-rules. The resulting structure $\lambda\beta\delta$ is shown to have a non-universal convertibility relation along the Tait/Martin-Löf method) and sui generis discrimination properties. Due to the latter feature a stronger form of the Adequacy Theorem for numeral systems is shown to hold in $\lambda\beta\delta$. In V.4 the standard numerals to work with in the sequel are introduced and, as a by-product, the ring of integers is shown to be representable via lambda-terms in $\lambda\beta\delta$. Finally, the Church-Kleene lambda-notation for the constructive ordinals (cf. Bull. Amer. Math. Soc., 44, 1938, pp. 224-232) is refined and simplified in V.4.3.

Chapter VI (Logic and Arithmetic: Quantifier-free Systems) works out a segment of Church's program for the formalization of logic and arithmetic within a "type-free" context. The propositional part of the system(s) proposed here is analysed in detail in VI.1, VI.2 (semantics) and VI.3 (syntax) and it is shown that the resulting formal system (a Rosser combinatory logic) C_o is consistent and has a complete set of derivable rules of procedure relative to general accepted standards for classical propositional logic. Also, a "type-free" system of arithmetic, A_o is proposed in VI.4 and shown to be sufficient for the formalization of the Primitive Recursive Arithmetic (the consistency of both C_o and A_o is insured in the intended way, via the Church-Rosser theorem for $\lambda\beta\delta$).

A transfinite hierarchy of systems C_α, A_α, extending C_o and A_o resp. (α any constructive ordinal) is studied in Chapter VII (Logic and Arithmetic: Arrows). Various concepts of relevant implication, in the sense of N. D. Belnap Jr., are shown to be representable in specific extensions of C_o. Following a less known

proposal of Church (1935), a transfinite hierarchy of quantifiers is shown to be available in the resulting extensions (VII.4), while analogues of Curry's "restricted generality," "functionality," "n-adic predicativity," etc. can be defined in terms of the basic Rosser combinators and Church's delta such that they split into a transfinite hierarchy, mirroring in some natural way the Church-Kleene lambda-notation for the constructive ordinals (VII.3, VII.5). The "type-free" systems proposed and discussed in Chapters VI and VII are relevance-preserving in the sense they do not allow formalizing, in the proposed context, classically and intuitionistically valid principles of the form EX FALSO QUODLIBET. Finally, it is easily seen that only theories possessing r.e. models admit of a "type-free" formalization in ordinal progression on the pattern suggested here thereby establishing the limits and strength of the Church program.

It is hoped these considerations may re-vivify the recent debate (A. Chauvin, D. S. Scott, P. Aczel, etc.), relying mainly on model-theoretic work on lambda-calculi, around a "type-free" foundation of logic and arithmetic.

The Appendix (Adequate Numeral Systems in $\underline{\underline{\lambda\beta\kappa}}$) collects the examples of adequate numeral systems in Schönfinkel-Curry lambda-calculus known so far to the author, in view of a possible classification.

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* *

According to recent information due to Dr. Vlad Georgescu (Micro-Magazin, in Romanian, New York), Professor COSTACHE TELEMAN with the Faculty of Mathematics, University of Bucharest, is still forbidden by the authorities to develop teaching activities. This punishment is due to the religious belief of Professor Teleman, who openly admitted being an active Roman Catholic, and is against the Romanian Constitution, and against the laws regulating the occupancy of vacant positions in the Higher Education in Romania.

TRAIAN LALESCU, 1882-1929

Traian Lalescu (Trajan Lalesco) was a prominent personality in Romania during the last two decades of his relatively short life. After brilliant studies at the Universities of Bucharest and Paris, Traian Lalescu has been appointed to a professorship with the Bucharest Polytechnic in 1911, following Spiru Haret. Simultaneously, he was called to teach Rational Mechanics at the University of Bucharest, on a temporary basis, and two years later (1913) he became a Professor of Algebra with the same university.

Besides the fact he was a very active presence in the academic community of those years, Traian Lelescu deployed remarkable activities in the public life. He has been sent to Paris (1918-1919) with a diplomatic mission, where he has written a monograph dedicated to the Romanian province of Banat (incorporated into the Hapsburgic Empire until 1918), the native place of his parents. In 1920 he became the Director of the newly created Polytechnic School of Timisoara - an institution brought into being due to his ability to draw the necessary support from the authorities. In 1921 Traian Lalescu founded the "Revista Matematica din Timisoara," a publication which had an existence of almost 30 years, and which significantly contributed - together with "Gazeta Matematica" - to the diffusion of mathematical knowledge in Romania, particularly among students, teachers, engineers, and other interested categories.

Traian Lalescu was twice elected in the Romanian Parliament, and carried out a considerable amount of duties. Among others, he was several times a "referee to the budget."

All the above specified achievements stand beside his impressive list of publications - almost 140 titles - including a monograph on Integral Equations with worldwide circulation, and which is the first book on the subject with complete treatment of Fredholm theory. Lalescu was also known to the Romanian reader as an outstanding author of textbooks for college students. Some of them were still in circulation in the 1940's.

Since this paper aims at a concise presentation of Lalescu's life and work, in

occasion of the Centennial of his birth, we shall list some of the most significant data concerning his academic career.

1882: Lalescu was born in Bucharest, on July 12th.

1892-1896: Junior High School in Craiova and Roman.

1896-1900: High School in Iaşi (Lyceum Internat). He graduated with "Honor," and paid special attention to mathematical subjects in the curriculum.

1900: He wins the entrance examination to the National Polytechnic in Bucharest

1903: Lalescu withdrew from the Poltechnic, and became a student (Mathematics Major) with the University of Bucharest.

1905: Graduated from the University, where he took courses with D. Emmanuel, G. Tzitzeica, Anton Davidoglu, Ermil Pangrati, and became a student at Sorbonne (as the beneficiary of the "V. Adamachi" fellowship).

1906: Graduated in Mathematics from Sorbonne, where he studied mainly under Picard's guidance.

1908: Lalescu obtains his degree of "Docteur ès Sciences" from Sorbonne, with a thesis entitled "On Volterra Equation."

1908-1909: On his way back home from Paris, Lalescu spends time in Göttingen, where he attended Hilbert's courses.

1909-1911: Held various positions as Mathematics Teacher in Bucharest and Giurgiu.

1911: Lalescu's book on Integral Equations is published in Bucharest.

1911: Professor at the Polytechnic of Bucharest.

1912: The French translation of the book on Integral Equations is published in France, with foreword by E. Picard.

1913: Professor of Algebra and Number Theory with the University of Bucharest (tenured 1916).

1918: The Polish translation of Lalescu's book on Integral Equation is published in Warsaw.

1919: Student with the "École Supérieure d'Électricité" in Paris, where he takes coursed with Paul Janet.

1920: Teaches Trigonometric Series and Integral Equations at the University of Bucharest.

1920: Director of the Polytechnic School of Timisoara.

1921: Lalescu founded the "Revista Matematica din Timisoara".

1929: Lalescu died in Bucharest, on June 15th.

PARTIAL LIST OF PUBLICATIONS

1. Sur la composition des formes quadratiques. Nouvelles Ann. Math., Paris, IV-e Série, VII (1907), p. 145-150.
2. Sur la dérivée des potentiels de simple et de double couche. Bull. Sci. Math., Paris, II-e Série, XXXI (1907), Première Partie, p. 77-79.
3. Sur la fonction $D(\lambda)$ de Fredholm. C. R. Acad. Sci., Paris, CXLV (1907), p. 1136-1139.
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Note. The above presentation of Lalescu's life and activity, including the selection of the listed papers has been compiled by C. Corduneanu.

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memory of Traian Lalescu. It contains letters from E. Picard, V. Volterra, G. Tzitzeica, D. Pompei, a.o.

3. Traian Lalescu, Introducre la Teoria Ecuatiilor Integrale,Editura Academiei, Bucuresti, 1955 (with foreword and biographical data by A. Halanay).

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Dr. MIHAI C. BOTEZ, a Romanian mathematician currently working in Systems Theory, who is known as an outspoken critic of the communist regime of Romania (where he lives) has written the following to the editor of Libertas Mathematica: "I take the opportunity to inform you that in occasion of the International Congress of the History of Science, held in Bucharest in August 1981, it has been officially forbidden to mention any Romanian scientist, in particular a mathematician, who does not live presently in Romania; incredibly, the history of our culture is thus denaturated."

In Memoriam

GHEORGHE MIHOC 1906-1981

On December 25, 1981, Professor Gheorghe Mihoc, the President of the Romanian Academy of Sciences, died in Bucharest. He was born in Braila on July 7, 1906, graduated from the University of Bucharest, Mathematical Department of the Faculty of Sciences, in 1928, and obtained a Ph.D. degree in Statistics from the University of Rome, 1930. He also held a Ph.D. degree in Mathematics from the University of Bucharest, 1934.

During his brilliant career as a professor with the University of Bucharest, and a well known scientist in the field of Probability Theory and Mathematical Statistics, Professor Gheorghe Mihoc actively cooperated with his former professor and adviser, Octav Onicescu. They put together the bases of a high level scientifical school of mathematical research, in Romania, in this field. From this successful activity emerged the Center for Mathematical Statistics of the Romanian Academy of Sciences, founded in 1964, and directed long time by Professor Gheorghe Mihoc. In this way, he contributed to the development of a powerfull stream of mathematical research in Romania, promoted by the Institute of Mathematics of the Romanian Academy of Sciences (abolished in 1975), and the Center for Mathematical Statistics, as well. His human qualities played also an important role in attracting young people toward research, and contributed to the development of a Romanian research group in Probability and Statistics. Some of his former students became well known professors in Romania, some won international recognition as distinguished scientists. A few names in the long list of former successful students: C. T. Ionescu Tulcea, Gh. Marinescu, M. Iosifescu, R. Teodorescu, S. Guiaşu.

Through his publications, Professor Gheorghe Mihoc brought a distinguished contribution to the scientific life. The book "Dependance stochastique. Chaines et familles de chaines discontinues," ed. Hermann, Paris, 1937, published by O. Onicescu and Gh. Mihoc, introduced the concept of "chaîne à liaisons complètes" which has further been studied by most Romanian probabilists, and generated a new chapter in Probability Theory, and new results in Mathematical Statistics. An enumeration of the scientifical contributions included in about 180 papers is beyond the aim of this

brief paper.

Professor Gheorghe Mihoc was elected in 1955 a correspondent member of the Romanian Academy of Science, and in 1963 promoted to a full membership. He held the offices of Chairman of the Mathematical Department (1951-1959), Vice-president (1959-1963), and President (1963-1968) of the University of Bucharest. He was also for a long while the President of the Romanian Mathematical and Physical Society, being involved in all the actions targeting to the continuous updating of the mathematical and physical training in the Romanian high-schools, by means of new textbooks, all sort of competitions, summer courses for teachers, etc. In 1980 he was elected President of the Romanian Academy of Sciences.

In cooperation with Octav Onicescu, and some younger colleagues, Professor Gheorghe Mihoc wrote several textbooks and treatises on Probability and Statistics. In the last part of his life, he encouraged the applied research and the cooperation between the universities research centers, and the industry.

His death is a great loss for the Romanian mathematical community, and an occasion of deep sorrow for all those who knew him.

Irinel Dragan

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The VIII th ARA Convention will meet from April 21 to April 23, 1983, at the University of California, Davis. The main focus is on

"ROMANIAN NATION AND THE WESTERN WORLD".

A session on mathematical topics is also planned. Please contact Prof. C. Corduneanu.

FROM THE BOOKSHELVES

Vasile I. Istratescu: Fixed Point Theory. An introduction. D. Reidel Publishing Company, Dordrecht, Boston, London, 1981, xv + 466 pp.

Contents: 1. Topological spaces and topological linear spaces. 2. Hilbert spaces and Banach spaces. 3. The contraction principle. 4. Brouwer's fixed point theorem. 5. Schauder's fixed point theorem and some generalizations. 6. Fixed point theorems for nonexpansive mappings and related classes of mappings. 7. Sequences of mappings and fixed points. 8. Duality mappings and monotone operators. 9. Families of mappings and fixed points. 10. Fixed points and set-valued mappings. 11. Fixed point theorems for mappings on PM-spaces. 12. The topological degree. References. Index.

Starting with fairly standard results, such as the contraction mapping, Brouwer's fixed point in finite dimensional spaces, or Schauder's fixed point result in spaces of infinite dimension, the author gradually takes the reader toward some of the more sophisticated recent results in this field. Fixed point results due to Krasnoselskii, Rothe, Ky Fan, Darbo, and Sadovski, as well as some applications of Lomonosov's theorem (regarding invariant subspaces) are included.

A positive feature of the book is the motivation of each abstract result by various applications, mainly existence results for some of the most usual functional equations.

The book can be used as a graduate text for students in Mathematics. It does also provide good opportunities for persons specializing in System Analysis, Theoretical Economics to find useful mathematical tools, and sometimes instructive examples.

Ivan Erdelyi (Editor): Operator Theory and Functional Analysis. Research Notes in Mathematics, No. 38, Pitman Publishing Limited, San Francisco, London, Melbourne, 1979, iv + 164 pp.

The volume contains ten invited papers given at the Session on Operator Theory

and Functional Analysis, organized by Professor Erdelyi during the 1978 Summer Meeting of the AMS (held in Providence, R.I.).

J. G. Stampfli, Recent developments on the invariant subspace problem; C. R. Putnam, Invariant subspaces of operaotrs having nearly disconnected spectra; R. Lange, Strongly analytic subspaces; J. J. Buoni and A. Klein, Remarks on the generalized Calkin algebras; R. G. Bartle, Selfadjoint operators and some generalizations; I. Erdelyi, Spectral resolvents; G. W. Shulberg, Spectral resolvents and decomposable operators; S. Campbell, G. Faulkner and R. Sine, Isometries, projections and Wold decompositions; E. Berkson and H. Porta, The p-norms of peak functions; G. Backman and A. Sultan, Alplications of functional analysis to topological measure theory.

Nicholas Rau: Matrices and Mathematical Programming. An Introduction for Economists. St. Martin's Press, New York, 1981, XIII + 235 pp.

This is a good textbook on Matrix Algebra and Linear Programming, at the undergraduate level. The first four chapters are devoted to Matrix Algebra: after defining the operations with vectors and matrices and the inverse matrix, and presenting their properties, the author considers the linear systems and shows how they can be solved by means of Gauss-Jordan pivoting, as well as by Tucker pivoting. Topics like: bases, orthonormal bases, orthogonal complement are also presented. The next four chapters are devoted to Linear Programming: after introducing some examples with practical meaning, the author gave the primal simplex method in great detail. The duality theory of linear programming and the complementarity results are discussed, too; the revised simplex method and a procedure for avoiding the cycling make the text complete enough. The last three chapters are devoted to the optimality conditions expressed by the Kuhn-Tucker theorem, and to the Fritz-John Theorem. No numerical method for solving a nonlinear programming problem is given. For example, the quadratic case was at hand. The book is rigorous enough for being a suitable textbook on all the presented topics. Each method is illustrated by an example, and some exercises are proposed at the end of the chapters. The only possible criticism is that the computer is not present in the text, at least in some chapters with a more algorithmic content. The textbook can be used by students in engineering, economics, and social sciences.

Irinel Dragan (Arlington, Texas)

Adrian Rezus: Lambda-Conversion and Logic. Drukkerij Elinkwijk BV, Uthrecht, 1981, xii + 197 pp.

This volume represents the Ph.D. thesis defended by the author at the University of Utrecht. Its contents is described in the Section "Ph.D. theses recently defended" of the present volume of Libertas Mathematica.

S. D. Zaidman: Abstract Differential Equations. Research Notes in Mathematic N° 36, Pitman Publishing Limited, San Francisco, London, Melbourne, 1979, viii + 130 pp.

Contents: 1. The Cauchy problem and associated semi-groups. 2. Uniformly correct Cauchy problem and semi-groups of class C_0. 3. Uniqueness of the Cauchy problem. 4. Weak solutions of the nonhomogeneous equation. 5. Asymptotic behaviour. 6. Regularity of Solutions. 7. Asymptotic behaviour (continued). 8. Weak solutions on the real line. 9. Elementary solutions. 10. Almost-periodic solutions.

The investigation of Cauchy problem in Banach or Hilbert spaces is the main concern of this monograph. Using Hille-Yoshida's theory of semi-groups, as well as various results in Functional Analysis, the author provides a good deal of results concerning the solution of the Cauchy problem for first order or second order differential equations: $x' = Ax$, $x'' = Ax$, the nonhomogeneous corresponding equations being also dealt with. Since the basic assumption concerning A is the fact that this operator generates a semigroup of linear bounded transformations of the underlying space, it is obvious that applications to partial differential equations could be obtained as particular cases. The asymptotic behaviour to which major attention is paid is the boundedness of the solutions at infinity. This includes the case of finite limit at infinity, as well as the almost periodic case. The book is well written, and besides classical results obtained before 1960, it contains most of the author's contributions pertaining to this topic, from 1960 to 1974.

L. Solomon, M. Hocquemiller: Mathématiques Appliquées et Calculatrices Programmables. Masson, Paris, 1982, viii + 256 pp.

Contents: 1. Preliminaries. 2. Various formulas. 3. Simulation of finite

processes. 4. The zeros of a numerical function. 5. Differentiation. 6. Numerical integration. 7. Differential equations (Cauchy's problem).

The aim of the authors - both non-computer scientists - is to provide the necessary knowledge in using the pocket calculator to solve such basic problems (mathematical and applied) as those mentioned in the Contents. From author's foreword: "Contemporary Mathematics penetrates more and more the domains of a sensible and hard logic. The users are taking the risk to become blind clients of the computer, and of those who know how to use it. The use of pocket calculators is exactly the opposite of such an elitism, which renders us dependent and vulnerable." And further: "We concentrate on the programmable pocket calculators of scientific type. They are no substitute to any theorem. They help us to understand and use these theorems. They are no substitute either for the computer, because they are slow and have short memory. Nevertheless, try to imagine how much Newton, Euler, Laplace or Gauss would have paid to get a pocket calculator! ... They teach us the logic: iteration, logical comparison, how to structure a program in subprograms, etc." The authors have done, undoubtedly, a good job in writing this book. It is addressed to any person who has a knowledge of Calculus, at the beginning level.

Izu Vaisman: Foundations of Three-dimensional Euclidean Geometry. Marcel Dekker, Inc., New York and Basel, 1980, x + 268 pp.

Contents: 0. Introduction (the axiomatic method and its utilization in Euclidean Geometry; useful concepts from other Mathematical Theories). 1. Affine spaces (The incidence axioms; the axiom of the parallels; the fundamental algebraic structure of an affine space; coordinates in affine spaces; affine transformations). 2. Ordered spaces (The order axioms and their first consequences; polygons and polyhedra; ordered affine spaces; continuity axioms). 3. Euclidean spaces (The congruence axioms and their relations with incidence and order axioms; Euclidean spaces; a short history of the parallel axiom; the independence of the parallel axiom).

Each chapter ends with a good amount of problems for solution, and a final section contains hints toward the solution of the proposed problems.

The book is based on lectures given by the author at the University of Iasi-Romania. Besides the student in Mathematics, the book has appeal to those high

school mathematics teachers who are interested in the modernization of the teaching of geometry.

The publication of this book is highly welcome. It has been first scheduled for publication while the author was a faculty member with the University of Iasi-Romania, by the Editura Technica in Bucharest (in Romanian). When the author decided to emigrate to Israel, the title has been withdrawn from the publications list of Editura Technica, and the Romanian readers lost a good opportunity to consult this book.

Vasile I. Istratescu: Introduction to Linear Operator Theory. Marcel Dekker, Inc., New York and Basel, 1981, xi + 579 pp.

Contents. 1. Preliminaries (Set Theory and General Topology). 2. Banach spaces. 3. Hilbert spaces. 4. Banach algebras. 5. Spectral representation of operators on Hilbert spaces. 6. The numerical range. 7. Nonnormal classes of operators. 8. Conditions implying normality. 9. Symmetrizable operators. 10. Invariant subspaces and some structure theorems. 11. The Weyl spectrum of an operator. 12. Analytic and quasi-analytic vectors. 13. Schwarz norms. 14. Maximum theorems for operator-valued holomorphic functions. 15. Uniform ergodic theorems for some classes of operators. Appendix: C_p classes.

The book encompasses both classical theory of operators on Banach or Hilbert spaces, and some modern theory of operators on the same spaces. In the last category of results we should mention those results based primarily on the use of Banach algebras, as well as the theory of symmetrizable operators, nonnormal classes of operators, recent results on the invariant subspaces (Lomonosov's theorem), and other topics.

The book originates in a course given by the author at the Centro Linceo di Scienze Matematiche e loro Applicazioni. The graduate student will find the book very useful. The researcher will have a chance to fruitfully consult this book in regard to those topics that do not usually appear in standard textbooks and monographs on Functional Analysis.

E. E. Rosinger: Nonlinear Partial Differential Equations (Sequential and weak

solutions). North-Holland Publ. Co., Amsterdam, New York, Oxford, 1980, xix + 317 pp.

Contents: 1. Sequential solutions of nonlinear PDE's. 2. Necessary and/or sufficient conditions for the existence of sequential solutions. 3. Algebras containing the distributions. 4. Resolution of singularities of weak solutions for polynomial nonlinear PDE's. 5. Stability and exactness of sequential and weak solutions for nonlinear PDE's. 6. Characterization of the necessary structure of the algebras containing the distributions. 7. Quantum scattering in potentials positive powers of the Dirac delta distribution. 8. Products with Dirac delta distributions. 9. Linear independent families of Dirac delta distributions at a point. 10. Support and local properties. Appendix I: Neutrix calculus and negligible sequences of functions. Appendix II: The impossibility embedding result of L. Schwartz. Appendix III: Nonlinear extension of the Lax-Richtmeyer equivalence between stability and convergence of difference schemes. Appendix IV: The Cauchy-Bolzano quotient algebra construction of the real numbers.

The sequential solutions are defined - roughly speaking - as "ideal limits of classical solutions." Of course, a kind of convergence must be specified, which usually leads to a complete space of generalized functions (even more general than the space of distributions in the sense of L. Schwartz). The construction proposed by the author leads to a class of generalized functions that can be organized as algebras. This makes possible the investigation of such nonlinear PDEs which can be written as

$$\sum_{j=1}^{h} \overline{\left| \; 1 \leq j \leq k_i \right|} \; D^{p_{ij}} u(x) = f(x).$$

The author systematically pursues the goal of constructing sequential solutions for the above considered PDEs, and investigates their basic properties: stability, exactness, smoothness. Applications are given to the equations of Magneto-Hydrodynamics, General Relativity Theory, Quantum Mechanics.

The book is written at a fairly advanced level, and is primarily addressed to specialists in the field of PDEs.

D. Mangeron and N. Irimiciuc: Mecanica Rigidelor cu Aplicatii in Inginerie. (Mechanics of Rigid Bodies with Applications in Engineering). Editura Tehnica, Bururesti, 1981, 550 pp.

The book (in Romanian) is the third volume of a sequence the authors have undertaken the task to write. The first two volumes are dedicated to the basics of Mechanics, as stipulated by the syllabus in effect in Romanian Polytechnic Schools. This third volume covers more special topics, such as (a) Kinematics of vibration systems, (b) Dynamics of vibrations of systems (consisting of rigids), (c) Stability of motions of vibrant systems. The mathematical apparatus displayed in this book involves ordinary differential equations, both linear and nonlinear, matrix analysis, complex variables including transform theory, stochastic processes, Fourier analysis. It is a good textbook for engineers and the graduate student in Mechanics (or Mechanical Engineering) will find plenty of material regarding the mathematical modeling of Vibration Theory.

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OCTAV ONICESCU, Professor Emeritus with the University of Bucharest, is 90 years old. The Romanian mathematicians in exile send him the warmest congratulations for his achievements in research and teaching, during his career of almost seven decades.

ADOLF HAIMOVICI, Professor Emeritus with the University of Iaşi, is 70 years old. He continues to fulfill his duties as a Ph.D supervisor, and as Editor of the "Analele Ştiinţifice ale Universităţii Iaşi"-series Mathematics. Professor Haimovici is warmly congratulated, on this occasion, by his former students, now in exile.

THE AUTHORS OF VOLUME II

ABDOL-REZA AFTABIZADEH was born on May 2nd, 1951 in Abadan, Iran. He obtained a B.S. degree in Mathematics in 1975, from the National University of Iran in Tehran. The M.S. degree in Mathematics has been awarded to him in 1978 by the Texas Women's University in Denton, Texas, and the Ph.D. degree in Mathematics has been earned in 1981, at the University of Texas at Arlington (Thesis title: Contribution to the Study of Asymptotic Behavior of Solutions of Ordinary Differential Equations). During the academic year 1981-82, Dr. Aftabizadeh held an Instructorship at the Department of Mathematics, the University of Texas at Arlington. Starting September 1, 1982, Dr. Aftabizadeh is an Assistant Professor with the Department of Mathematics, Pan American University, Edinburg, Texas.

CONSTANTIN CORDUNEANU (see the biographical note in Volume 1).

IRINEL DRAGAN was born in Iasi, Romania, in 1931. He obtained his Diploma in Mathematics in 1954, and a Ph.D. degree in Mathematics in 1961 from the University of Iasi. He was associated with the University of Iasi until 1980, holding successively positions of Lecturer, Associate Professor and Professor for Operations Research. Since 1962 he was teaching various Operations Research courses like Mathematical Programming, Graphs and Combinatorics, and Game Theory. He published various papers about the following topics: Parametric programming, Nonlinear integer programming, Minimum cost multicommodity flows, Concepts of solution in the theory of cooperative n person games with side payments. Since 1980 he held visiting positions with the University of Pisa, Italy, University of Kassel, West Germany and University of Texas at Arlington, U.S.A. His current address: Department of Mathematics, The University of Texas at Arlington, Arlington, Texas 76019, U.S.A.

EMIL GROSSWALD was born in Bucharest (Rumania) on the 15th December 1912. He obtained a Licenta (Master's Degree) in Mathematics from the University of Bucharest in 1933, and the Diploma of Electro-Mechanical engineer from the Scoala Politechnica (Institute of Technology) in 1936. After military service and work in Bucharest and Milano, he continued studies in Paris (École Superieure d'Électricité) and Montpellier. After 5 years spent in Havana (Cuba), he taught Mathematics in Porto Rico, came in 1948 to the continental United States and obtained the Ph.D. at the University of Pennsylvania (Philadelphia) in 1950. He taught in Canada (Univ. of Saskatchewan, in Saskatoon) 1950-51, spent two years at the Institute for Advanced Study in Princeton, N.J. (1951-52 and 1959-1960), joined the faculty of the University of Pennsylvania (1952-1968) and later that of Temple University (1968-1980). During sabatical leaves, and after his retirement from Temple University, he taught at the University of Paris (1964-65), the Technion, Haifa, Israel (1972-1973 and 1980-1981), the University of New Hampshire, Dover, N.H. (1967-1968) and Swarthmore College, Swarthmore, Pa. (1980). He has published several books (Topics in Number Theory, Macmillan, 1966; second edition by Birkhauser, 1982; The Bessel Polynomials, Springer Lecture Notes #698, 1978; Dedekind Sums (with Rademacher), Carus Monograph No. 16 of the Mathematical Association of America, 1972; editor of the Collected Papers of Hans Rademacher-MIT Press, 1974) as well as numerous papers in professional journals. Main research interests: Number Theory and Analysis. Current address: Department of Mathematics, Temple University, Philadelphia, PA 19122.

G. ISAC was born in Filipesti (Braila), Romania, on April 1, 1940. He obtained his diploma in Mathematics from the Faculty of Mathematics and Mechanics (University of Bucharest) in 1963. In 1973 he received the Ph.D. degree in Mathematics, with a thesis on Topological Ordered Vector Spaces, under Professor C. Constantinescu from the Institute of Mathematics in Bucharest. He has been appointed a Research Fellow (1963) with the Computer Centre (University of Bucharest), an Assistant Professor (1968) with the Faculty of Mathematics (University of Bucharest), a Professor and Head of Department (1974) with the National University of Zaire and, a Research Fellow (1977) with the Department of Mathematics (University of Sherbrooke-Canada). He emigrated in 1977 to Canada and now he is a Canadian citizen. While in Romania,

he was an assistant to the Professors Gr. Moisil and G. H. Marineseu, members of the Romanian Academy. He gave invited talks in many universities (Limoges, Pau, Louvain, Florence, Poitiers, Gent, McGill, Laval, Sherbrooke). His research interests are: Nonlinear Analysis, Numerical Analysis and Optimization. Main publications: "Analysis on ultrametric fields" (jointly with Gh. Marinescu) at Romanian Academy of Sciences, and "Cônes localement bornés et cônes complètement réguliers. Applications à l'Analyse non-linéaire" (séminaire d'Analyse moderne, Nr. 17 - Université de Sherbrooke). Presently he is with the Department of Mathematics at Collège militaire royal de Saint-Jean, St-Jean, Québec, Canada.

ADRIAN REZUS was born on October 29, 1949 in Radauti (Romania). He studied philosophy at the University "Al.I.Cuza", Jassy, and at the University of Bucharest, obtaining a Lic. Phil. degree with a Master's thesis on the Semantics of Mediaeval Logic. Later on, he attended courses in the Mathematics curriculum at the University of Geneva ("Faculté des Sciences"). In 1981, June, he completed his Ph.D. degree at the University of Utrecht. From 1972 on, he held various research and teaching positions in Bucharest (Institute of Philosophy), Utrecht (Rijksuniversiteit: Institute of Philosophy, Chair of Philosophy and Foundations of Mathematics) and Eindhoven (University of Technology, Department of Mathematics and Comput. Science). Current address: Alex. van Humboldt-Straat, 3514 GP Utrecht, The Netherlands

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