News and Notices. Academician Ján Jakubík awarded the Klement Gottwald State Prize

NEWS and NOTICES

ACADEMICIAN JÁN JAKUBÍK AWARDED
THE KLEMENT GOTTWALD STATE PRIZE

Academician JÁN JAKUBÍK has been awarded the Klement Gottwald State Prize for 1979 for his revealing results in the theory of ordered algebraic structures.

With the exception of a few of his works all the scientific work of J. Jakubík has been concerned with algebra. At the beginning of his research work he devoted himself to the theory of lattices and (partially) ordered sets, as well as to several problems of universal algebra. Later on he intensively studied the theory of (partially) ordered groups.

In the theory of lattices and ordered sets he investigated problems connected with such basic notions as congruence relations, chains, different types of products, etc. For example he investigated the problems of commutability of congruence relations and their characterization by weak projectivity of intervals. In several papers he studied the validity of the Jordan-Dedekind condition for infinite chains. Many of his results were concerned with the problem to what extent a (discrete) lattice could be determined by its (unoriented) graph. He investigated in detail properties of the center of a lattice, especially those which he proved to be connected with direct decompositions. In particular, he found conditions for the closedness of the center of a complete lattice which included conditions found by various other authors as special cases.

He paid great attention to the study of different types of products of ordered sets, lattices, and ordered groups. He also studied the problem of existence of a common refinement of two direct decompositions, or conditions under which the given object could be decomposed into a direct or a weak product of directly irreducible factors (for complete lattices this is true if their center is a completely distributive complete lattice). The results of J. Jakubík on mixed products of ordered groups represent an essential generalization and an extension of the known results on lexicographic products.

Several interesting results have been obtained by J. Jakubík in studying the following problem: Which properties of ordered groups depend only on the structure of its order? Let us mention two of his results: Firstly, if in a directed ordered group the corresponding ordered set can be decomposed into a direct product, then this decomposition induces a direct decomposition of the group, too. Secondly, the decomposibility of an l-group into a direct product of linearly ordered groups depends only on its lattice properties. However, the decomposibility of an l-group into a (nontrivial) subdirect product cannot be decided by its lattice properties alone.

In a number of his works J. Jakubík has demonstrated the importance of the concept of disjoint elements of an l-group. He has also systematically investigated the connection of the concept of an orthogonal subset in an l-group with its properties and has dealt with some problems concerning orthogonal extensions of l-groups. In solving problems of interval topology of l-groups he has obtained results, some of which are of definitive character. Interesting results have been obtained on radicals of l-groups and of radical classes of l-groups (this concept represents an extension of the concept of torsion class as studied by J. Martinez).

Many of the works of J. Jakubík were inspired by the problems known from G. Birkhoff's monograph or by works of other authors. The solution of those problems appeared to be a starting point to results extending beyond the frame of the original problem. On the other hand, other authors have based their work on the results of J. Jakubík and in some cases the collaboration was mutual.

An aspect of J. Jakubík's activity that cannot be forgotten has been his contribution to the education of young scientists together with his rich educational activity and his activity of our scientific life.

On the occasion of the important distinction, all Czechoslovak mathematicians express their congratulations to the laureate and wish him further success in his creative work.

Milan Kolíbiar, Bratislava

PROFESSOR KAREL REKTORYS AWARDED NATIONAL PRIZE

RNDr. KAREL REKTORYS, DrSc., Professor of the Faculty of Civil Engineering of the Czech Technical University at Prague, was awarded National Prize for his monograph *Variational Methods in Engineering Problems and in Problems of Mathematical Physics.*

Karel Rektorys studied mathematics at the Faculty of Science of Charles University, Prague. After graduating from the university he joined the theoretical research department of the Škoda Works at Plzeň. Here he prepared — in addition to a number of research reports — his first extensive work *Problem of uniqueness of solutions of partial differential equations for heat conduction under discontinuous initial and boundary value conditions,* submitted as an RNDr. thesis in 1951. It originated from the problem of cooling big steel ingots. From the mathematical point of view, this was the first study of parabolic differential equations which dealt with another concept of solution than the classical one.

From the Škoda Works, Rektorys came to the Central Institute for Mathematics (later Mathematical Institute of the Czechoslovak Academy of Sciences) joining the department of Prof. Vyčichlo. This department worked then on a big research project for the Orlík Dam construction — the problem of hydratation heat. This consists in the following: the concrete contains cement; after laying a block a chemical reaction occurs which heats concrete up to 50 °C; this results in heat tensions which are often greater than those caused by the weight of the dam and the pressure of water. The task of K. Rektorys was to determine the temperature inside the dam in the course of its construction (his results served as the basis for evaluation of heat tensions by Dr. Babuška). Both the theoretical and numerical solution of the problem was contained in Rektorys's work *Evaluation of temperature inside the dam with inner heat sources* (Czech, Rozpravy ČSAV *66* (1956)), submitted as thesis for the degree of Candidate of Science. The subject was further developed in some papers prepared in the department of numerical methods of solution of differential equations of the Mathematical Institute of the Czechoslovak Academy of Sciences.

The same subject is further developed also in Rektorys's Doctor of Science thesis *Nonlinear heat conduction in concrete masses.* He was the first to prove existence of solutions of the mixed problem for nonlinear heat equation on an arbitrary time interval by the method of nets. (Until then, other authors had proved existence on a sufficiently small interval only, using the method of nets.)

The research concerning the Orlík Dam initiated a number of papers of which Rektorys was co-author, but the most important was the book *Mathematical Theory of Plane Elasticity* (Czech, Publ. House of the Czechoslovak Ac. Sci., Prague 1955; 522 pp.) whose German translation *Mathematische Elastizitätstheorie der ebenen Probleme* (Berlin, Akademieverlag 1960) is widely known and appreciated both as a monograph and a textbook.

K. Rektorys won considerable popularity not only among engineers and physicists but also among mathematicians by the book *Survey of Applicable Mathematics* (Czech, Publ. House os Technical Literature, Prague 1963, 1137 pp.) the preparation of which he led as Chief Edtior; af co-author he wrote more than one half of the text. The book has appeared already in three editions and its English translation (same title, London, Iliffe 1969) has served as an official handbook at the well known Massachusetts Institute of Technology.

K. Rektorys was awarded National Prize for his monograph *Variational methods in engineering problems and in problems of mathematical physics* (Czech, Publ. House of Technical Literature, Prague 1974, 601 pp.). The book appeared also in English translation, in a little extended version, as *Variational Methods in Mathematics, Science and Engineering* (Reidel Publ. Co., Dortrecht (Holland) — Boston (U.S.A.) 1977).

The book is an extensive monograph whose first half is written for those who use mathematics, above all for engineers (Parts I, II, III). In Part I the author explains (in a well intelligible form) the necessary results from the theory of operators in Hilbert spaces, in Part II the reader gets acquainted with the theorem on minimum of the energy functional, Part III contains applications to solution of numerous problems (from the elasticity theory etc.) including complete numerical treatment. The other half of the book has monographic character. The exposition is based on the Lax-Milgram Theorem and on the notion of a weak solution. Although this part is intended above all for mathematicians, it is presented in such a way that it is well comprehensible also to a reader who is no specialist in mathematics. Part IV offers a generalization of the preceding results (in particular to nonsymmetrical problems and to the case of nonhomogeneous boundary conditions), Part V is devoted to the problem of eigenvalues and Part VI to some special methods. Especially the latter half of the book contains some new methods developed by the author and a number of his original results, some of which are published only in this book. Here we refer above all to an essential generalization of Collatz's method for two-sided estimates of eigenvalues of differential equation of the type $Au - \lambda Bu = 0$. While Collatz's method was intended for ordinary differential equations, it is here generalized to the case of sufficiently general elliptic operators A, B (cf. Part V, Chap. 40). This subject, which has been published solely in this book, is developed in further works by Rektorys and his collaborators.

Another method presented here for the first time is a method of solution of the biharmonic problem with sufficiently general boundary conditions (which is used in evaluation of supporting walls). The requirement of sufficient generality led to the introduction of the so called very weak solution. The method was then published (including its numerical aspects) in an extensive paper in Aplikace matematiky *19* (1974), 2, pp. 101—131 (co-author V. Zahradník). The paper by K. Rektorys, J. Danešová, J. Matyska, Č. Vitner: *Solution of the first problem of plane elasticity for multiply connected regions by the method of least squares on the boundary* (Aplikace matematiky *22* (1977), Part I No. 5, pp. 349—394, Part II No. 6, pp. 425—454) generalizes the method to the case of multiply connected domains (supporting walls with holes).

The book includes also the author's method of time discretization for the solution of parabolic problems (a generalization of the classical Rothe method), which had been published before in the paper *On application of direct variational methods to the solution of parabolic boundary value problems of arbitrary order in the space variables* (Czech. Math. J. *21* (*96*), (1971), pp. 318—339). This paper initiated research of many other authors (in Czechoslovakia e.g. J. Nečas, J. Kačur). The method has turned out to be very suitable and sufficiently universal even for solution of evolution equations of other types including integrodifferential ones.

The book does not contain only new methods but also other author's results. In particular, let us mention Chap. 39, an essential refinement of the current inequalities of Friedrichs's type in Chap. 18 etc. Let us point out also a non-traditional treatment of boundary conditions of Neumann's type in Chap. 35 as well as Chaps. 19, 34, 44 etc.

The book attracted an extraordinary interest not only among mathematicians but also among research workers and theoretical engineers because it provides a possibility of getting acquainted in an intelligible form with efficient mathematical methods which can be then used to solve difficult theoretical problems. And this is the main reason of its importance for applications of mathematics.

Our mathematical community congratulates sincerely Prof. Karel Rektorys, whose scientific work has developed always in the closest connection with his rich educational activities at the Faculty of Civil Engineering of the Czech Technical University, to the present acknowledgement of his work, and wishes him good health and further successes in both research and education.

Marie Valešová, Praha

IN MEMORIAM PROFESSOR JOSEF BREJCHA

RNDr. Paed. Dr. JOSEF BREJCHA, CSc., Professor of Mathematics and Descriptive Geometry at the Faculty of Mechanical Engineering, Technical University at Brno, died after a short severe illness on March 9, 1979 at Brno.

Professor J. Brejcha was distinguished for his merits by the State Medal for Development. His scientific work concerns a wide range of problems from both elementary and differential geometry. He was author of a number of original problems, mostly from geometry.

A more detailed biography of Professor J. Brejcha is published in Časopis pro pěst. mat. *105* (1980).

IN MEMORIAM PROFESSOR JOSEF SCHMIDTMAYER

RNDr. JOSEF SCHMIDTMAYER, CSc., Associated Professor of the Faculty of Electrical Engineering, Czech Technical University at Prague, died suddenly on April 23, 1979, at the age of sixty five years.

Prof. Schmidtmayer's scientific work was directed to applications of mathematics in mechanics and technical sciences. In the last years he devoted himself also to the theory and practice of mathematical education at technical universities. He was member of the Editorial Board of the journal Aplikace matematiky.

A more detailed biography of Professor J. Schmidtmayer is published in Časopis pro pěst. mat. *104* (1979), 418—420.

SIXTY YEARS OF PROFESSOR FRANTIŠEK MARTAN

Associated Professor FRANTIŠEK MARTAN, CSc., head of department of Mathematics at the Faculty of Electrical Engineering, Czech Technical University, branch Poděbrady, reaches sixty years of age on November 3, 1979.

Prof. F. Martan's main field of interest is the theory and practice of mathematical education at technical universitites.

A more detailed account of life and work of Prof. Martan is published in Časopis pro pěst. mat. *104* (1979), 421—422.