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STUDIA MATHEMATICA BULGARICA

ПЛИСКА

БЪЛГАРСКИ МАТЕМАТИЧЕСКИ СТУДИИ

THE 50TH ANNIVERSARY
OF ACADEMICIAN BLAGOVEST HRISTOV SENDOV

Academician Prof. Dr. Blagovest Sendov was born on February 8, 1932 in Asenovgrad. In 1949 he graduated High school in his native town. He studied mathematics at Sofia University in 1952—1956. He specialized numerical mathematics at the Moscow University in the academic year 1960—1961 and at the London University for six months in 1968. He obtained his Ph. D. degree at Sofia University in 1964 and he became Dr. Sci. at the Institute of Mathematics of the Academy of Sciences of USSR in Moscow in 1967. In 1963 he became assistant-professor, and in 1968 he became professor. In 1974 he was elected corresponding member of the Bulgarian Academy of Sciences, and in 1981 — academician. In 1975 he was elected Doctor Honoris causa of Moscow State University. In 1969, jointly with Acad. R. Canev, he was awarded Dimitrov prize.

He worked as follows. In 1949—1952 he was a worker, in 1957—1958 he was a teacher in Boboševo village and in the town of Elin Pelin. In 1958—1961 he worked as an assistant at the Chair of Higher Algebra of Sofia University. In 1961 he became a senior mathematician at the Chair of Higher Analysis on the staff of the Computing Centre of the Bulgarian Academy of Sciences and Ministry of Public Education. In 1963—1968 he was assistant professor in numerical mathematics at the Chair of Higher Analysis. In 1968 he went to the new Chair of Numerical mathematics. Since 1968 he is professor in numerical mathematics, since 1971 he is Head of the sector of Mathematical Modelling. In 1967—1970 he was Vice-director of the Institute of Mathematics with Computing Centre of the Bulgarian Academy of Sciences. In 1970—1973 he was Dean of the Faculty of Mathematics (later on — Faculty of Mathematics and Mechanics) of Sofia University and vice-director of the Centre for Research and Training in Mathematics and Mechanics.

For six years (1973—1979) he was Rector of the Sofia University. Since 1976 he is Member of Parliament. Since 1978 he is chairman of the Specialized Scientific Council on mathematics of the Higher Certifying Committee. In 1980 he became Vice-president of the Bulgarian Academy of Sciences, and in 1982 he became Vice-president and General Scientific Secretary of the Bulgarian Academy of Sciences.

At different periods he was member of the Committee for Mathematics and Physics of the Higher Certifying Committee, the Committee for Dimitrov prize, the National Committee for Mathematics and of other national and international bodies. In 1980 he became Vice-president of the World Peace Council.

He has published 105 scientific papers, 3 monographs, 5 textbooks and a series of popularizing papers. For these publications there are 117 comments

and citations by foreign authors and approximately 120 by bulgarian authors.

In 1960 he began to work in the theory of approximations, applying an unused until then in approximation problems metric — the Hausdorff distance. In a series of his and his students' papers a new direction in this theory was constructed: the Hausdorff approximations.

The most outstanding of his results are: the universal estimate for the best Hausdorff approximations by polynomials and the exact constant in this estimate; the series of theorems on Hausdorff approximations of certain classes of functions, of curves in the plane, etc.; Hausdorff approximations by linear operators. Also he proved that from the general estimates for Hausdorff approximations follow a series of classical results, for example the Jackson theorem.

The investigations of Prof. Sendov in this field have been continued by his students and other authors in Bulgaria and abroad. The main part of them was presented in his book "Hausdorff approximations", Sofia, 1979. Thus was created the School of Hausdorff approximations.

The theory of Hausdorff approximations is the most substantial part of his mathematical works.

A number of his papers is connected with a new characteristic of functions — a new modulus. This modulus has properties completely analogous to that of the classical moduli of smoothness and the integral moduli of continuity, occupying an intermediate place between them. For the first time similar moduli were used in the doctor thesis of Bl. Sendov (1968). It turns out, that these moduli have wide application in many problems of the approximation theory and numerical methods. By means of these moduli a characterization of the best one-sided approximations of functions was obtained, more precisely, estimates of Jackson's type were obtained. Recently many papers on one-sided approximation have been published by foreign mathematicians: T. Ganelius, G. Froid, A. A. Ligun, V. F. Babenko, V. G. Doronin et al., but theorems of Jackson type have not been obtained. Another direction, in which these moduli have been applied, is their employment in estimating the error in numerical methods, in particular, estimating the error in numerical solution of differential equations. Applying the method of conservative uniform schemes, estimates of the numerical solution of the boundary problem for ordinary differential equations of second order have been obtained. He obtained these estimates without additional assumptions of existence of more derivatives of the solution then is required for the formulation of the problem. With additional assumptions he obtained specific orders under less restrictive conditions than the already known.

Bl. Sendov has contributed substantially to the interval arithmetic, developing the theory of segment analysis. Segment analysis could be considered as a modification and extension of interval analysis, which is very intensively developed at present. The final aim of this field is to give practically reasonable boundaries for the errors in calculations on computers. The existing interval analysis, developed by Sunaga, Moor and their followers, cannot solve this problem completely. The segment analysis, proposed by Bl. Sendov, has a series of priorities over the "classical" interval analysis. Defining the segment arithmetic, Bl. Sendov gives the basic notion: segment limit of a segment sequence; this is the segment which is the intersection of all the segments that contain all the terms of the sequence except for a finite number of terms.

The important point is that by this definition every sequence of segments has a limit. Then the segment limit of a segment-valued function is introduced and on the basis of this definition the basic notion — segment derivative, is introduced. For the segment derivative the traditional notions of analysis are developed: the analogue of Rolle's theorem is obtained, the conditions of monotonicity and for extremum are given. The characterization of segment derivatives of Lipschitz functions is given. The segment derivatives are employed to study the convergence of derivatives of sequences of linear positive operators.

Bl. Sendov has papers on graph theory, programming, numerical methods, etc.

For his joint investigations with Acad. R. Čanev on invention and experimentation with mathematical models in biology, they were awarded Dimitrov prize in 1969.

Acad. Sendov very actively participates in the process of training and formation of specialists. He was assistant, assistant-professor and since 1968 he is professor. Seven of his students have obtained Ph. D. and two of them — Dr. Sci. He takes active part in the elaboration of problems in education.

Academician Ljubomir Iliev