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# PROFESSOR V. L. MAKAROV IS 60!

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In 2001 the famous Ukrainian scientist in the field of numerical mathematics, Corresponding Member National Academy of Science of Ukraine (NASU), Doctor of Physical and Mathematical Sciences, professor Volodymyr Leonidovych Makarov aged 60 years old. Numerous achievements of modern numerical mathematics are concerned with name of professor V.L. Makarov. He has developed many algorithms for solving different problems of the Mathematical Physics, many other ones were developed and used for practical calculating under his supervision and at his direct participation. V.L. Makarov has carried out also quite large range of theoretical investigation in numerical mathematics. His works include all the problems, which appear during numerical solving of mathematical problems. These works have opened new directions in the theory of difference schemes, in automatical design of complex radio engineering systems etc. Professor Makarov developed the base of common theory of polynomial interpolation non-linear operators in abstract spaces and recently got new important results in constructive representation of the solution operators for differential equations with operator coefficients in Hilbert and Banach spaces. The last ones allow to construct efficient numerical algorithms without accuracy saturation or exponential convergent algorithms for solving partial differential equations, integral equations etc.

In 1963 V.L. Makarov graduated from mechanics and mathematics faculty of Kyiv State University. In 1967 he received Ph.D. in Physics and Mathematics from the Kyiv State University. In 1974 he was being granted a Doctor of Science degree in Physics and Mathematics and became Professor of Applied and Computational Mathematics.

In the period between 1981 and 1998 V.L. Makarov was the chair of the Department of Numerical Methods of Mathematical Physics of the Kyiv National University of Ukraine. On October of 1998 - he has become the chief of department of numerical mathematics of Mathematics Institute (NASU). He published more than 260 papers and books, among them there are:

- Scientific manual from methods of calculating;
- Textbooks for Numerical Methods;
- Monographs:
    1. Spline-approximation of functions. Moscow, Vysshaya Shkola, 1983 (in co-authorship);
    2. Difference scheme for differential equations with weak solutions. Moscow, Vysshaya Shkola, 1987 (in co-authorship);
    3. Mathematical support of complex experiment. Kyiv, Naukova Dumka, 1982-1990 (in 5 volumes, in co-authorship);
    4. The base of theory of polynomial operators interpolations. Kyiv, NASU, 1998 (in co-authorship);
    5. Interpolation of operators. Kyiv, Naukova Dumka 2000 (in co-authorship).

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6. Methods of Calculations, Kyiv, Vystsha Shkola, (in 3 volumes, in co-authorship).
7. Collection of Exercises in Methods of Calculations, Kyiv, National University of Ukraine, (in 2 volumes, in co-authorship).

Since 1963 till 1974 the main direction of V.L. Makarov's scientific activities were the theory of difference schemes. In this period he was the first who introduced and studied the new class of difference schemes - so-called difference scheme with exact and explicit spectrums. Studying the mathematical apparatus of these schemes, special functions of discrete argument, V.L. Makarov achieved some important results in the theory of associated orthogonal polynomials. Difference schemes with exact spectrums are widely used in practice, especially when solving hyperbolic equations with non-smooth solutions.

V.L. Makarov made an important contribution into development of the theory of exact and truncated differences scheme, the base of which were established in 1959–1968 by academicians A.N. Tikhonov and A.A. Samarskiy. He and his followers proved the existence and uniqueness theorems for exact differences scheme for vectorial systems of ordinary differential equations of the second order, of ordinary differential equations of the forth order, differential equations with degeneration on the boundary and in unbounded domains. Sufficient conditions for conservatism of differences scheme for dynamics of gases equation were pointed out.

In 1979–1980 in the common works of V.L. Makrov and academician A. A. Samarskij were proposed a new perspective direction in numerical mathematics, namely difference schemes, which rate of convergence is adjusted to the smoothness of the solution of the primary differential problem. These investigations were continued in numerous investigations by V.L. Makarov and his followers. Differences scheme with adjusted convergence rate for quasi-linear problems of mathematical physics in Sobolev spaces were defined and studied. Now these models are widely used in mechanic, elasticity theory, theory of operating systems with distributed parameters etc.

Since 1975 V.L. Makarov began the active investigations in the field of development the theoretical base for automatic projection of difficult radio engineering systems. Here under his supervision and at his direct participation were created the mathematical conception of systems of embedded models, methods of verification of mathematical models, the statistical approach to the problem of verification. The important attention was paid to the algorithmical realization of mathematical models, where essentially were used results by V.L. Makarov in the field of numerical methods.

During last years V.L. Makarov laid the foundation of general theory of the polynomial interpolating of the non-linear operators in abstract spaces. The necessary and sufficient existence and uniqueness conditions for polynomial interpolants in Hilbert and vector spaces were proven and constructive procedures to construct these polynomials were proposed. Generalizations for the case of interpolation conditions containing Gato derivatives in all directions and others were received.

A series of results of fundamental importance were received by professor V.L. Makarov in the field of constructive representation of solution operators for differential equations with operator coefficients in Hilbert and Banach spaces. These results were the base for new efficient parallel approximations without accuracy saturation or with an exponential convergent rate to solutions of various partial differential equations.

Professor V.L. Makarov has been tutoring for 35 years in the Kyiv University, giving cardinal normative and special courses in numerical mathematics. He created a school of numerical mathematics, which includes, beside others, 41 candidates and 8 doctors of physical-mathematical sciences, which have prepared theirs thesis under his supervision Results published by V.L. Makarov are widely known in the scientific world and make an important contribution to mathematics.

Under his guidance a constantly acting seminar on numerical mathematics takes place. He directs a problem board of numerical mathematics. For 10 years V.L. Makarov belonged to the editorial board of the journal 'Differential equations', he's a member of editorial boards of the journals CMAM, AMI, a deputy editor-in-chief of the Journal of Numerical and Applied Mathematics, he repeatedly belonged to specialized boards of the doctoral and Ph.D. thesis defends. He was invited speaker at a number of International conferences and schools of applied mathematics; he's a head of the International Coordinating Board of the Numerical Mathematics, the member of the American Mathematical Society.

In 1995 he won grant and was given an honorary title 'Soros professor'. In 1997, being a member of a scientific group, he won grant DFG (German research association), several times he won DAAD grants. For the gained success in his work he was awarded with the order of the Labor Red Flag, with medals. In 2000 V.L. Makarov was elected as a Corresponding Member of the NASU.

Volodymyr Leonidovych Makarov is full of new scientific ideas and conceptions. His active work promotes development of numerical mathematics in Ukraine and recognition of the achievements of Ukrainian mathematicians by the world scientific society.

The authors of this issue of the Journal of Numerical and Applied Mathematics cordially congratulate the jubilee celebrator and dedicate to him their articles. We wish Volodymyr Leonidovych under the complicated modern conditions of scientific process in Ukraine all his plans to be realized, creative successes and scientific longevity.