For the Jubilee of Vladimir Mikhailovich Chernov

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Abstract. On April 25, 2019, Vladimir Chernov celebrated his 70th birthday, Doctor of Physics and Mathematics, Chief Researcher at the Laboratory of Mathematical Methods of Image Processing of the Image Processing Systems Institute of the Russian Academy of Sciences (IPSI RAS), a branch of the Federal Science Research Center "Crystallography and Photonics" RAS and part-time Professor at the Department of Geoinformatics and Information Security of the Samara National Research University named after academician S.P. Korolev (Samara University). The article briefly describes the scientific and pedagogical achievements of the hero of the day.

1. Introduction

Vladimir Mikhailovich Chernov graduated from the Department of Mechanics and Mathematics of Kuibyshev State University in 1974 and was assigned to work as an assistant at the Department of Applied Mathematics of Kuibyshev Aviation Institute (presently, Samara University). He taught the "classical" mathematical disciplines: Mathematical Analysis, Linear Algebra, Theory of Algebraic Structures etc. He occupied the position of the Deputy Dean at the Department of Computer Science for more than ten years.

In 1976 he entered a postgraduate program at the Department of Algebra and Number Theory of Saratov University. After finishing the postgraduate studies in 1979, he returned to the Department of Applied Mathematics of Kuibyshev Aviation Institute, where, in addition to his academic work, he was engaged in scientific research in the field of number theory, he also organized and conducted student seminars on the topics related to his research...

2. Academic Career

The scientific activities of V.M. Chernov made a sharp turn and gained momentum in 1989, when he teamed up with a small but active research group led by the associate professor V.V. Sergeyev, which worked at the Research Laboratory No. 35 at the neighboring Department of Technical Cybernetics, he became part of this group and got actively involved in solving a wide range of issues on computer signal and image processing. As early as in 1993, he defended his candidate's thesis on the topic "Algorithms for discrete orthogonal transformations with a recurrent basis in digital signal processing", which was highly appreciated by the academic community, in particular, by the academician Yuri Ivanovich Zhuravlev, the founder of the Russian school of algebraic theory of algorithms and pattern recognition. Less than six years later, on the day of his 50th birthday, Vladimir

Mikhailovich defended his doctoral thesis “Arithmetic methods for the synthesis of fast algorithms of discrete transformations” at the dissertation council of the Computing Center of the Russian Academy of Sciences (Moscow) chaired by the academician Y.I. Zhuravlev.

Starting from 1994, Vladimir Mikhailovich has been working at the laboratory of mathematical image processing methods of the Image Processing Systems Institute of the RAS [1], where he has been continuing to develop his research area, which has come into the international spotlight. His priority achievements are listed below:

1. Development of a constructive algebraic-arithmetic approach to the synthesis of fast algorithms of the class of discrete orthogonal transformations according to the scheme:

a) embedding of the field containing the values of input signals and basic transformation functions into some topological algebra;

b) calculating an auxiliary associated transformation with the values in this algebra with regard to its specific structural and topological properties;

c) displaying the result obtained in the field (ring) containing the values of the output signal.

In particular, algorithms of Discrete Fourier Transform (DFT) with a reduced computational complexity (including the reduction in the order of asymptotic complexity) were synthesized within the framework of such approach. The auxiliary “quaternion DFT” introduced by the author was used further by foreign researchers as a self-sufficient transform.

2. Development of a method for synthesizing the DFT analogs with the values in Clifford algebras and fast algorithms for calculating them - in collaboration with German colleagues.

3. Proof of the fundamental possibility of linear separability of recognizable classes of objects due to the special choice of the comprehensive algebraic structure and non-Archimedean metric in it (for example, the Prüfer polyadic numbers).

His recent work has been devoted to transferring the ideas and methods of the theory of positional number systems to algebraic extensions, with the application to the problems of developing computer arithmetic, spectral analysis on “fractal” fields, fast and error-free computations, cryptography, etc.

The works of V.M. Chernov are published actively in Russian and foreign scientific press. His monograph “Arithmetic methods for the synthesis of fast algorithms for discrete orthogonal transformations” published in 2007 by Fizmatlit publishing house became widely known, as it contains a large number of bright and ingenious author's ideas, and is written in a delightful style [2]. As of today, he has made more than 150 scientific publications in the form of articles, chapters of monographs, detailed materials in the proceedings of international conferences, etc. The most significant publications of V. M. Chernov are listed in the references to this article [2-54].

V.M. Chernov was awarded the Prize of the Samara Region Governor in the field of science and technology for the year 1999 for his work “Algebraic-arithmetic methods for discrete spectral analysis of multidimensional information”.

V.M. Chernov is actively teaching at Samara University [55]. He has developed the original courses “Mathematical Methods of Cryptography and Information Security”, “Computer Algebra” etc., these courses have been delivered many times to the students studying at the specialties “Applied Mathematics and Computer Science” and “Information Security of Automated Systems”. V.M. Chernov pays great attention to the training of highly qualified scientific specialists: ten persons defended their candidate dissertations under his guidance: Chicheva M.A. (1998), Aliyev M.V. (2003), Bespolitov O.V. (2005), Belov A.M. (2007), Kalugin A.N. (2008), Mitekin V.A. (2009), Uryvskaya D.A. (2012), Fedoseev V.A. (2012), Kasparyan M.S. (2015), Bogdanov P.S. (2015).

V.M. Chernov has a wide experience of scientific expertise: many times he has been acting as an opponent of candidate and doctoral dissertations, he is a member of two dissertation councils of Samara University, an expert of the Russian Foundation for Basic Research and a number of other scientific foundations, a member of program committees of all-Russian and international conferences. As a member of the editorial board of the scientific journal Computer Optics, he is responsible for the area of image processing, and in this position, he makes a significant contribution to the promotion of the journal to the international bibliographic databases Scopus and Web of Science [56].

He participates in international scientific professional associations: he is a member of the International Association for Pattern Recognition (IAPR); a board member of IAPR Technical

Committee 16 “Algebraic and Discrete Mathematical Techniques in Pattern Recognition and Image Analysis”.

3. Conclusion

We would like to wish the estimable Vladimir Mikhailovich Chernov good health, energy and many talented students, so that he could continue his research and achieve new results in the fundamental scientific field he is developing!

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