



Anatoly Lakeyev (1954–2024)

Sad news came from Irkutsk, an old Siberian city on the shores of Lake Baikal. On August 3, 2024, Prof. Anatoly V. Lakeyev passed away at the age of 70.

He was a specialist in the field of qualitative theory of dynamic systems, interval analysis, computational complexity theory, being the head of Department of dynamic properties and control of complex objects at the Institute of System Dynamics and Control Theory of the Russian Academy of Sciences.

Anatoly was born in 1954 in the city of Angarsk in the Irkutsk region, grew up in Irkutsk itself. Then he entered Novosibirsk State University, Faculty of Mathematics and Mechanics, from which he graduated in 1976. After university, he was assigned to work as a mathematician-programmer in the Laboratory of

Mathematical Theory of Systems of the Siberian Power Engineering Institute of the Academy of Sciences.

In 1980, Anatoly moved to the Irkutsk Computing Center of the Academy of Sciences and devoted most of his life to this institute, later renamed the Institute of System Dynamics and Control Theory. Over the years, he held the positions of research fellow, head of the laboratory, department, deputy director for research work and, finally, acting director (in 2006–2007).

Most researchers in Interval Analysis and applications know Anatoly for his work on the complexity theory of interval computations, which he began to study at the turn of the 80-90s of the last century.

The 1990s were a kind of “storm and stress” period in this area of our science, when after many years of calm and internal preparation, many important results concerning the NP-hardness or NP-completeness of various problems were suddenly obtained, so that in general the entire theory quickly acquired a completely finished form, which it basically retains to this day. The main contribution to this breakthrough was made, in essence, by three people — Vladik Kreinovich, Anatoly Lakeyev and Jiri Rohn, who became the main co-authors of the fundamental book [1], a true “bible of interval computation complexity”.

Other interesting works followed (see, e. g., [2, 3, 4, 5, 6, 7]), the last of which Anatoly completed this spring and presented at the Russian interval analysis webinar. Unfortunately, Nature is sometimes mercilessly inexorable, and the time it gives us for life and creativity is so little . . .

The memory of Anatoly and collaboration with him will forever remain in our hearts and the hearts of many of his colleagues, while some of his results will enter the “golden fund” of interval analysis.

References

- [1] V. KREINOVICH, A. LAKEYEV, J. ROHN, AND P. KAHL, Computational Complexity and Feasibility of Data Processing and Interval Computations. – Kluwer, Dordrecht, 1998.
- [2] HEINDL G., KREINOVICH V., LAKEYEV A.V. Solving linear interval systems is NP-hard even if we exclude overflow and underflow // Reliable Computing. – 1998. – Vol. 4, No. 4. – P. 383–388. URL: <http://www.nsc.ru/interval/lakeyev/publications/98rc.pdf>
- [3] LAKEYEV A.V. On existence and uniqueness of solutions of linear algebraic equations in Kaucher’s interval arithmetic // Developments in Reliable Computing. – 1999. – P. 53–65.
- [4] LAKEYEV A.V. Computational complexity of estimation of generalized solution sets for interval linear systems // Computational Technologies. – 2003. – Vol. 8, No. 1. – P. 12–23. URL: <http://www.ict.nsc.ru/jct/getfile.php?id=408>

- [5] LAKEEV A.V. Systems of linear interval equations with a finite set of solutions // Modern technologies. Systems analysis. Modeling. – 2009. – V. 23, No. 3. – P. 42–48. (in Russian) URL: <http://www.nsc.ru/interval/lakeyev/publications/09StSaM.pdf>
- [6] LAKEYEV A.V. On unboundedness of generalized solution sets for interval linear systems // *Reliable Computing*. – 2014. – Vol. 19, No. 3. – P. 290–301. URL: <https://www.reliable-computing.org/reliable-computing-19-pp-290-301.pdf>
- [7] LAKEYEV A.V., SHARAYA I.A. Quantifier-free description of the solutions sets of the generalized interval-quantifier system of linear equations. – Deposited in arXiv.org, No. arXiv:1809.01184. URL: <https://arxiv.org/abs/1809.01184>

Alexander N. Bazhenov, Elena V. Chausova, Boris S. Dobronets,
Vladik Kreinovich, Sergey I. Kumkov, Alexander Yu. Morozov,
Vyacheslav M. Nesterov, Nikolai M. Oskorbin, Elena V. Ponkina,
Mikhail A. Posypkin, Olga A. Popova, Alexander V. Prolubnikov,
Sergey P. Shary, Sergei I. Zhilin