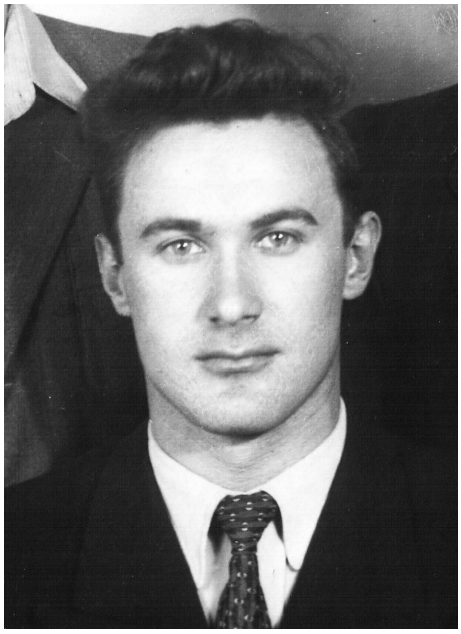
The articles in this
and the following issues
are dedicated to the memory of
A. G. Kostyuchenko



Anatolii Gordeevich Kostyuchenko

On April 2, 2010, Anatolii Gordeevich Kostyuchenko, a prominent scientist in the area of functional analysis and its applications, died in Moscow.

A. G. Kostyuchenko was born on April 19, 1931 in the family of a surgeon on Doslidne Pole station near the town of Sinel'nikove, Dnipropetrovs'k region, Ukraine. In 1949, he entered the Department of Mathematics and Mechanics at Kyiv State University, and graduated from it in 1954. Studying in his first years at the university, A. G. Kostyuchenko already manifested his mathematical talents. Being a student he published two papers in a leading mathematical journal in the USSR. These papers, among other results, contained original and simple approaches to already known mathematical facts.

A. G. Kostyuchenko's scientific adviser was G. E. Shilov, a distinguished specialist in functional analysis, a Moscow mathematician, who at that time was working for several years in Kyiv. In 1954, G. E. Shilov returned to Moscow State University, and A. G. Kostyuchenko became his post-graduate student there. Just then, G. E. Shilov together with I. M. Gelfand were actively developing the theory of distributions , a new branch of functional analysis that emerged a few years before. A. G. Kostyuchenko, naturally, became involved in this research, too, and obtained there some new results.

At the same time, still a young person at the age of 24, he and I. M. Gelfand published, in "Dokl. Akad. Nauk SSSR", a short communication entitled "An eigenfunction expansion of differential and other operators". In this paper, the authors looked at an eigenvector of a selfadjoint operator A in a new way, and introduced the notion of a generalized eigenvector as a distribution that is formally an "eigenvector" of the operator

A. This notion helped to understand and "put in place" numerous works, often on a physical level of rigor, which dealt with eigenvectors not belonging to the space where the operator A acts. The paper initiated a vast number of works that, on the one hand, revealed the real gist of the matter and, on the other hand, gave a better understanding of the way to write expansions in eigenfunctions of differential and other type operators which have continuous spectrum and no usual eigenfunctions. Starting in 1955, the name of A. G. Kostyuchenko became widely known among mathematicians.

Having finished his PhD thesis in 1957, A. G. Kostyuchenko continued to work very fruitfully, involving his colleagues and students in the research. His next series of works was dealing with the finite dimensional moment problem where the theory of spectral expansion in generalized eigenvectors of a finite system of commuting selfadjoint operators was used to obtain the moment representations. In the one-dimensional case, where a single selfadjoint operator occurs, such applications had already been considered, but the transition to several operators required fantasy and efforts.

Further works of A. G. Kostyuchenko were related to a study of spectral properties of selfadjoint operators generated by ordinary or elliptic differential expressions, which included constructing spectral expansions, studying asymptotics of the spectrum and the spectral function, etc. To investigate such asymptotics, he proposed, in particular, the so-called parabolic approach. These and related problems interested him all his life. His last works also deal with similar problems for a vector Schrödinger operator and its discrete analogue, the operator Jacobi matrices.

These studies are close to the other large series of works connected with the theory of non-selfadjoint operators, operator pencils, operator-valued functions. A construction of canonical representations of such quadratic pencils, and their investigation, are important, especially, for mathematical physics. Some works of this series are devoted to the study of particular important operators defined on a space with indefinite metric. A.G. Kostyuchenko's interest to differential operators with singular, in particular, point potential is one of pages of his activity, too.

On the whole, the results by A.G. Kostyuchenko mentioned above may be considered as a start and incentive for development of a new branch of functional analysis. He was a leader of a large community of mathematicians from various parts of the former Soviet Union, working in the indicated directions, and a scientific adviser to many scientists who wrote their Candidate or Doctoral theses at the Moscow State University where he worked as a Professor all his life. Certainly, he was an outstanding pedagogue. His lectures and talks were always distinguished by a deep penetration into the essence of a subject under discussion. This was generating the genuine scientific interests and desire to research. A.G. Kostyuchenko was also a member of Editorial Boards of several mathematical journals published in the USSR and, later, in Russia, an author and an editor of a number of fundamental monographs. For many years he was heading the well-known seminar on differential operators.

It is worth mentioning that the life of A.G.Kostyuchenko was typical for many talented Ukrainians who worked in Russia becoming Russian, or, at a last resort, Soviet, without remembrance about their Ukrainian origin, scientists, engineers, writers, musicians, etc. Anatolii Gordeevich himself never broke his links with Ukraine where his relatives and friends lived. He often came to Kyiv to participate in mathematical conferences, schools, seminars, defenses of theses. Almost from the beginning, starting with Volume 2, he was a member of Advisory Board of the journal "Methods of Mathematical Physics and Topology".

Last years of A. G. Kostyuchenko's life were tragic. He was very ill, and needed medical help almost each day. All of a sudden, his wife got ill and soon died. His two

daughters lived and worked in USA. Until his very last months, he lived alone in a large Moscow apartment, tried to stand to all the misfortunes, and continued to work.

The memory of A. G. Kostyuchenko will live forever in the hearts of those who knew him.

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