



SERGIY OVSIENKO

(01.05.1953 – 25.01.2016)

The famous Ukrainian mathematician Sergiy Ovsienko passed away on January 25, 2016. It was a sorrowful event and a grievous loss for the whole Ukrainian mathematical community, especially for those who knew him closely. We knew him as a talented and original scientist, as an outstanding teacher, as a kind and sensitive person, as a good friend.

Sergiy Ovsienko was born on May 1, 1953, in the family of teachers, in the village Hermanivka, Obukhiv district. Though his parents were philologists, they appreciated Sergiy's abilities to mathematics. So in 1967 he entered the Republican physico-mathematical boarding school attached to the Kyiv Taras Shevchenko University. His school teacher in mathematics, Volodymyr Vyshensky, who was also an assistant professor at the Chair of Algebra and Mathematical Logic, highly appraised the abilities, persistence and motivation of the young boy and perhaps played the crucial role in his formation. As a school student, Sergiy regularly

participated in Republican and All-Union mathematical olympiads, always being among the winners. In 1970 he graduated from the school with the highest distinction (golden medal) and entered the Department of Mechanics and Mathematics of the University. From his first years at the University, Sergiy was among the best students and actively participated in a lot of extra lectures and seminars, especially in algebra. Maybe, his preferences were motivated both by the influence of V. Vyshensky and by the personal charisma of professor Lev Kaluzhnin who was the head of the Chair of Algebra and Mathematical Logic and gave him lectures. Thus he took special courses in group theory, in representation theory, in homological algebra, etc. His first investigations, included in his diploma project, were devoted to a new branch of the theory of representations, namely, matrix problems and representations of quivers. He managed to construct analogues of reflection functors for representations of quivers with one zero relation and thus transferred to them the results of Bernstein–Gelfand–Ponomarev. One has to emphasize that to do so, he considered not only representations of quivers with relations, but also introduced a wider class of matrix problems, which cannot be formulated in terms of representations of algebras. In 1975 Sergiy Ovsienko got Diploma (Master degree) from the University and became a graduate student at the Institute of Mathematics of the Academy of Sciences of Ukraine. His advisor there was Andrei Roiter, the leader of the group of young mathematicians working in representation theory. During his study there, Sergiy Ovsienko obtained several deep and original results in the theory of matrix problems and integral bilinear forms, as well as important results on classification of such forms. He established (together with A. Roiter) the relations between non-symmetric Tits form and homological properties of representations of quivers (at the same time it was done by C.M. Ringel). Independently of V. Kac he defined root systems for a wide class of integral quadratic forms related to representations of quivers. He also proved the boundedness of roots for weakly positive forms. These results played an essential role in the development of the theory of matrix problems, which had just originated from the works of Kyiv school. This theory always remained in the center of his scientific interests and his input in its development is impossible to overestimate. In 1978 Sergiy Ovsienko was awarded the degree of Candidate of Sciences (an analogue of Ph.D.).

In 1982 Sergiy Ovsienko returned to the Department of Mechanics and Mathematics of the Kyiv Taras Shevchenko University. First he worked as a researcher and the head of a laboratory, and in 1988 he started his teaching at the Chair of Algebra and Mathematical Logic,

first as an assistant, then an associate and finally a full professor. He was indeed an outstanding teacher, and a lot of his students remember him as a person who has awoken in them an interest and abilities to research in mathematics. In particular, he played an important, maybe crucial role in the formation of of such graduates from the Kyiv algebraic school as V. Bavula, V. Bekkert, I. Burban, V. Futorny, A. Khomenko, V. Levandovsky, V. Mazorchuk.

An important event in his scientific career was the All-Union Algebraic colloquium of 1989 in Novosibirsk, where, for the first time at such colloquia, there was a big number of foreign mathematicians. The results presented there by Sergiy Ovsienko were indeed very deep and interesting. Due to support of German mathematicians, especially of C.M. Ringel, Sergiy Ovsienko obtained the Humboldt grant, so had possibility to visit European universities and personally contacted a lot of leading scientists. It certainly had a great influence on his further research. He also used his contacts with European mathematicians to help the students of the Kyiv Taras Shevchenko University to continue their study in the leading European universities. In 2006 Sergiy Ovsienko was awarded degree of Doctor of Sciences.

In this period Sergiy Ovsienko essentially broadened the area of his research. In particular, he was the author of a lot of new ideas and methods in the representation theory of Lie algebras. Together with Yu. Drozd and V. Futorny he introduced a new conception of Harish-Chandra subalgebras and Gelfand–Tsetlin modules. Further, in collaboration with V. Futorny, and A. Molev he extended this theory to representations of restricted Yangians and current algebras and also constructed Gelfand–Tsetlin bases in finite  $W$ -algebras and shifted Yangians. His one of the most prominent results was the proof of existence of Gelfand–Tsetlin modules with arbitrary Gelfand–Tsetlin characters and finiteness of isomorphism classes of such modules with a prescribed character. In connection with these questions, he introduced (together with V. Futorny) the notion of Galois orders and obtained deep results on their structure and representations. They also proved the Gelfand–Kirillov conjecture for the skew fields of fractions of finite  $W$ -algebras and gave a classification of generic irreducible Gelfand–Tsetlin modules for such algebras (together with A. Molev). Sergiy Ovsienko also obtained several essential results in the theory of generalized Verma modules (together with V. Mazorchuk). He also studied quasi-hereditary algebras and more general classes of stratified algebras, where he collaborated with S. König, V. Mazorchuk, C. Stroppel. He studied homological properties of such algebras, in particular, constructed

duality in their derived categories, generalized the construction of Ringel dual, proved that in each quasi-hereditary algebra there is a Borel subalgebra and it is Morita invariant. Together with V. Lyubashenko, they obtained deep results on  $A_\infty$ -categories. They also organized and conducted a seminar on derived categories and their applications at the Institute of Mathematics.

Certainly, Sergiy Ovsienko continued his work in the theory of matrix problems, first of all, in the study of representations of boxes, as one of the most powerful tools in representation theory. Together with Yu. Drozd, they considered Galois coverings of boxes and algebras, proved that Galois coverings with torsion free Galois groups preserve representation types of boxes and algebras and established relations of representations of the original and the covering box or algebra in finite and tame cases. Following Burt–Butler construction, he established deep relations of boxes with quasi-hereditary algebras, and, using ideas of the theory of  $A_\infty$ -algebras and  $DG$ -categories, gave a construction of a dual box. We are convinced that the ideas of Sergiy Ovsienko in this area will have a great impact on its further development.

The results of Sergiy Ovsienko as well as his original ideas were highly appreciated by the world mathematical community. His numerous talks at the scientific conferences and workshops through the world always attracted deep interest of his colleagues. He actively collaborated with the scientists from Germany, Sweden, Brazil and other countries.

The death of Sergiy Ovsienko has deprived us of a prominent scientist, an outstanding teacher, sensitive and honest person, good and trusty friend. His colleagues and students will always remember him.

*V. Bavula, O. Bezushchak, V. Bekkert,  
V. Bondarenko, I. Burban, M. Chernikov,  
Yu. Drozd, A. Ganyushkin, R. Grigorchuk,  
V. Futorny, V. Kirichenko, V. Levandovsky,  
V. Lyubashenko, V. Mazorchuk, A. Oliynyk,  
A. Petravchuk, V. Plakhotnyk, V. Sergeichuk,  
Ya. Sysak, V. Vyshensky, A. Zhuchok, Yu. Zhuchok*