IN MEMORY OF ANDREI VLADIMIROVICH ROITER

A famous algebraist Andrei Vladimirovich Roiter died on July 26, 2006 in Riga, Latvia.

He was born into a family of scientists on November 30, 1937 in Dnepropetrovsk, Ukraine. His father Vladimir A. Roiter, a member of the National Academy of Sciences of Ukraine, was a well-known physical chemist who worked on fundamental problems of catalysis. In 1955 A. V. Roiter enrolled as a freshman at Taras Shevchenko Kiev State University and in 1958 he transferred to Leningrad (now Saint-Petersburg) State University, where he received his undergraduate Diploma (M.S.) in mathematics in 1960 and in the same year began his graduate studies under the direction of a prominent mathematician Dmitry Konstantinovich Faddeev. At Kiev State, Roiter met a fellow mathematics major Ludmila Aleksadrovna Nazarova who transferred to Leningrad State at the same time and also became a student of Faddeev. Roiter and Nazarova married and collaborated on research in representation theory until Roiter's death. In 1961 Roiter was hired as a junior research scientist by the Institute of Mathematics of the National Academy of Sciences of Ukraine, and he worked at the institute until his death. In 1965 he was promoted to senior research scientist, in 1981 he was appointed Head of the Laboratory of Linear Algebra, and in 1991 he became Head of the Department of Algebra. While working at the Institute of Mathematics, Roiter received his Ph.D. in 1963 and his Doctor of Science degree (habilitation) in 1969.

In the beginning of his career he worked on integral representations of groups and rings, inspired by Faddeev who was an active propagandist of the area. Roiter's most novel and deep results were on integral representations of *rings*, more precisely, of orders in semisimple algebras. He was a pioneer, for the theory was just emerging and consisted mostly of some rather simple examples and very few general results. His best known work in the area is certainly his paper [8] on the representations belonging to a genus; recall that a *genus* is a class of (integral) representations whose all localizations are isomorphic. The Jordan–Zassenhaus Theorem implies that every genus contains only a finite number of isomorphism classes. Roiter proved that for every order Λ in a semisimple $\mathbb{Q}$-algebra there is a universal upper bound on the number of isomorphism classes in a genus. The paper had a great influence on the whole subject and inspired a series of papers and results on the structure of genera.

By the late 60's of the last century, Roiter's attention turned to representations of finite dimensional algebras. This change of direction was motivated by two conjectures on representations of finite dimensional algebras proposed by Brauer and Thrall, by Roiter's realization that methods he developed in his papers [4, 5, 6, 7] on integral representations should be useful in the work on the first Brauer-Thrall conjecture, and by the reduction by Nazarova and Roiter [1, 2, 3] of the Brauer-Thrall conjectures to certain problems of linear algebra. The idea to reduce a module theory problem to a linear algebra problem was not new, for this approach was used successfully by Roiter and his colleagues in their work on integral representations. What was new was that the class of matrix problems arising in connection with the Brauer-Thrall conjectures was very large, which suggested that one should develop the theory of matrix problems per se and then apply its results to the study of modules or other mathematical objects. Thus the general theory of matrix problems was born.

Roiter's big breakthrough came when he proved [9] the first Brauer-Thrall conjecture saying that for a finite dimensional algebra with infinitely many nonisomorhic indecomposable representations, the dimensions of indecomposable representations over the ground field are unbounded. He used methods that originated in his work on integral representations. His other very important contribution to representation theory of finite dimensional algebras was obtained jointly with Bautista, Gabriel, and Salmerón [14, 15]. The result was that a finite dimensional algebra over an algebraically closed field with only finitely many nonisomorphic indecomposable representations has a multiplicative basis. Using techniques developed in this work Bautista and then Bongartz proved the second Brauer-Thrall conjecture for an arbitrary algebraically closed field.

Among Roiter's numerous contributions to the general theory of matrix problems we mention two. In a joint paper with Nazarova [10] he introduced representations of partially ordered sets, an important class of matrix problems with many applications in representation theory of finite dimensional algebras and other areas. And in a series of papers [11, 12, 13], two of which were joint with Kleiner, he introduced representations of bocses, a very large class of matrix problems that provided the framework for Drozd's tame and wild theorem saying that a finite dimensional algebra over an algebraically closed field is either tame or wild but not both. The techniques of bocses were used in the subsequent work of Crawley-Boevey on tame and wild algebras and, in particular, in his description of the structure of the Auslander-Reiten quiver of a tame algebra.

Roiter was the founder of the Kiev school of representation theory, one of whose traits was an extensive use of methods of linear algebra. For many years he ran an algebra seminar that had a very positive influence on the development of young algebraists. The seminar was a place to pose a problem, to present a solution of a problem proposed earlier, or to listen to a talk by a distinguished speaker from out of town. Roiter was a natural born teacher. He was a lecture organizer at the University for Young Mathematicians at the Institute of Mathematics of the National Academy of Sciences of Ukraine, at the Small Academy of Sciences, and in the Department of Mechanics and Mathematics at Taras Shevchenko Kiev State University.

Roiter collaborated with many outstanding mathematicians from different countries, in particular, from Canada, Germany, Great Britain, Mexico, Russia, Switzerland, USA, and others. He was a member of scientific committees of many international conferences, took part in the work of the International Conference on Representations of Algebras, and gave an invited talk at the International Congress of Mathematicians in Helsinki. He was the author of two monographs and more than a hundred research papers, and he served as the Ph.D. thesis director for V. M. Bondarenko, N. S. Golovashchuk, T. Guidon, U. Hassler, M. Kleiner, V. V. Otrashevskaja, S. A. Ovsienko, V. V. Plakhotnik, O. S. Pylyavska, I. Redchuk, V. V. Sergejchuk, A. S. Shkabara, and A. A. Tsylke. The following eight members of the Kiev school received their Doctor of Science degree: V. M. Bondarenko, Yu. A. Drozd, V. V. Kirichenko, S. A. Kruglyak, L. A. Nazarova, S. A. Ovsienko, V. V. Sergejchuk, and A. G. Zavadskij. Roiter was a member of academic councils for the defense of Ph.D. or Doctor of Science theses and a member of the editorial board of Ukrainian Mathematical Journal.

We are deeply saddened by Roiter's death and will miss him as mathematician, colleague, and teacher.

V. M. Bondarenko, Yu. A. Drozd, V. V. Kirichenko, M. Kleiner, S. A. Kruglyak, S. A. Ovsienko

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