IN MEMORIAM: MIKHAIL A. TAITSLIN
1936–2013

Mikhail A. Taitslin passed away on July 20, 2013 in Tver, Russia, where he had lived and worked for the last three decades of his life. He was a devoted husband and father, whose high-level research bridged areas of mathematics and computer science. He was a well-respected educator and mentor of students.

Mikhail Taitslin was born into a family of medical research scientists on January 30, 1936 in Kiev, Ukraine. His father perished in WWII while serving as a doctor, and his mother raised their son alone. He received his undergraduate degree from the Lugansk Pedagogical Institute in 1957, and then started work as a school mathematics teacher while maintaining and developing an interest in higher mathematics. His continuing interest in higher mathematics brought Taitslin into contact with Anatoly I. Maltsev, a leading Soviet algebraist and logician, and then led to Taitslin's move to the Ivanovo Pedagogical Institute, where Maltsev worked at the time. Later in 1960, he followed Maltsev to Akademgorodok, the newly opened scientific and educational center in Novosibirsk.

M.A. Taitslin earned his Ph.D. in 1963, under the direction of Maltsev, and the Doctor of Sciences degree in 1968. He was a member of the Novosibirsk Institute of Mathematics of the Academy of Sciences of the USSR and lectured at the Novosibirsk State University, reaching the rank of a full professor. Mikhail had fond memories of those years in Akademgorodok when he was enthusiastically engaged in mathematics and where he also played an active role in its social life. But in the early 1970s, the political atmosphere in Akademgorodok had undergone dramatic change, and cases of injustice based on anti-semitism became a regular feature of academic life. In several instances, Taitslin fought to defend those individuals against such injustices, ultimately resulting in his losing his professorial position with the university. He was forced to leave Akademgorodok in 1976 and had been offered a position at Kazakh State University in Alma-Aty, Kazakhstan. In 1984, he moved to Tver State University in Tver, Russian Federation. In Alma-Aty and Tver, he put all his energy and talent in what he did best:

conducting high-level research and teaching mathematics to young people. At both universities, he was admired for his efforts and dedication.

M.A. Taitslin's scientific research extended across several areas of mathematics and computer science in which he made notable contributions. In the early 1960s, Taitslin produced significant results in the then popular study of problems on decidability of elementary theories. A 1965 survey article [1] on this topic, published jointly with Yu.L. Ershov, I.A. Lavrov, and A.D. Taimanov in the Uspekhi of Mathematical Sciences, played an important role in the development of the area. Taitslin explored decision problems for commutative semigroups and, in particular, proved [2] that the isomorphism problem for commutative semigroups is equivalent to the problem of conjugacy of tuples in the groups of integer matrices, which later was positively solved by algebraists.

In 1969–70, Taitslin taught a course on model theory at the Novosibirsk State University, followed by his own book [3], in which he, for the first time in the USSR, presented Morley's theory of categoricity and related results. With a group of dedicated students he started a seminar which began the studies in stability theory in the former USSR. One of the topics, the study of which he initiated, was the theory of categorical quasi-varieties [4]. This topic later developed into a rich area of research carried out in Novosibirsk mainly by Taitslin's student Eugeny Palyutin, as well as by other mathematicians in the USA. The study of uncountably categorical groups, proposed by Taitslin in 1971 to his Ph.D. student Boris Zilber, started the actively studied theory of groups of finite Morley rank. Subsequently, it led Zilber to the creation of geometric stability theory—one of the most important areas of present-day model theory. Another theme of the seminar was existentially closed structures, where Taitslin and his students Oleg Belegradek and Vladimir Belyaev obtained several important results. In particular, developing some ideas of Belegradek and another of Taitslin's students Mikhail Trofimov, in the paper [5] Taitslin and Belyaev formulated nice criteria for definability of relations in existentially closed models of certain theories called 'rich', and proved richness of many classical theories—for example, the theories of groups, semigroups, inverse semigroups, and associative rings.

After his move to Kazakh State University in 1976, Taitslin's main research interest shifted to logic in computer science, more specifically to the field of dynamic logic and finite model theory. Together with his student Alexei Stolboushkin, he solved a number of open problems in this area and, in particular, proved the indispensability of non-determinism and recursion in programming logic [6, 7]. Jointly with his student Ilmir Musikaev, he solved the problem of the impact of finiteness of memory on the expressive power of program logics [8].

Taitslin's seminar at Tver in the early 1990s discussed issues related to the multiplicative fragment of Girard's linear logic and some of its generalizations. Taitslin offered an interesting semantics of "barter deals" for this fragment and developed the concept of nets with bounded resources. In the paper [9], the seminar participants defined a linear logic to describe the behavior of these nets and solved some algorithmic problems. Jointly with

his student Dmitry Arkhangelsky, Taitslin studied linear modal logic as well as other modal logics as the descriptive languages for relational databases and parallel computing with fixed resources. Amongst other things, they established the polynomial time complexity for the problem of parallel transformation of a resource defined by a formula in the Horn subset of linear logic [10]. In the mid-1990s, Taitslin, jointly with Stolboushkin, proved in the paper [11] the absence of syntax for safe formulas in the theory of databases and programs for safe stratified Datalog. At the same time, he became interested in the question of the expressive power of various query languages. In this area of study, an important role belongs to the so-called "translation theorems", which show for the various universes the ability to translate queries in the extended language that includes the database relations and the universal relations into an equivalent query in the limited language that uses only the database relations and linear order. In their joint work [12], Belegradek, Stolboushkin, and Taitslin used advanced model theory to describe various universes for which the translation theorems hold true. A comprehensive survey [13] of the current state of affairs in this area, written jointly with his pupil Sergei Dudakov, is one of the last of the numerous publications by Mikhail Taitslin.

M.A. Taitslin invested a great effort into teaching of young mathematicians and computer scientists. At the universities where he worked, he taught introductory courses in general algebra, discrete mathematics, databases, programming, mathematical foundations of computer science, mathematical logic, and the theory of computation, as well as a variety of advanced special topics courses. For each of the courses he taught, Taitslin developed his own syllabus, and released lecture notes and training manuals. In particular, in 1973, he wrote a textbook "Mathematical Logic" [14] in collaboration with Ershov and Palyutin, which for several years was used to teach students at the Novosibirsk State University. In 1998, Taitslin and Stolboushkin published a three-volume textbook "Mathematical Foundations of Computer Science" [15], which is now used at the Tver State University as the main textbook for courses in mathematical logic, computability theory, and formal languages and automata.

Mikhail A. Taitslin was a wonderful teacher and mentor who touched the lives of all who knew him. It was an honor and privilege for those who were his friend and who studied with him.

<div align="right">Oleg Belegradek and Boris Zilber</div>

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