



**Alexey Fedorovich Leont'ev**  
*(to his centenary)*

On March 27, 2017, there was a centenary of an outstanding Soviet mathematician, a founder of the Ufa mathematical school on the theory of functions, a corresponding member of Academy of Sciences of USSR Alexey Fedorovich Leont'ev.

Alexey Fedorovich was born in 1917, in the village Yakovtsevo of Vach district in Nizhegorodskaya region. He was the last, thirteen child in his family. Having finished the first level school in 1929, Alexey Fedorovich continued his learning in Dzerzhinsk and then in Gorky.

In 1934, having finished 9 classes, he entered the faculty of physics and mathematics of Gorky university and then, having graduated with a distinction from the university, he entered the post-graduates courses. His scientific supervisor, professor Ivan Romanovich Braitsev, who created a school on the theory of analytic functions in the university, was of the following opinion on his post-graduated student: "Already being a student of GSU, comrade Leont'ev showed brilliant mathematical abilities ... Comrade Leont'ev specializes in ordinary differential equations and in this field, he shows great successes ... I am sure that with his brilliant mathematical gifts and a prominent interest to the mathematics ... comrade Leont'ev will score great successes in mathematical researches ..." <sup>1</sup>.

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<sup>1</sup>Cited by the book: "Outstanding scientists", ed. Prof. A.D. Zorin. Volgo-Vyatskoe izd-vo, Gordy (1988). (in Russian).

On some aspects of the life of Alexey Fedorovich during post-graduated courses remember candidate of chemical sciences (PhD) I.G. Sumin: “Since 1939, we lived with Alexey in the same room in the dormitory, we cooked together. And no matter how much in difficulties we were, our relations were friendly ... Very often we had to study in the red corner in the dormitory ... Alexey Fedorovich successfully passed the exams and prepared a candidate thesis. But the war began. We entered people’s volunteer corps. We did drills, went to collective farms to reap a harvest. Since Autumn 1941 till March 1942 we were building the lines of defense around Gorky”.<sup>1</sup>

In August 1942, Alexey Fedorovich successfully defended candidate thesis “Differential-difference equations” and after that he moved to a volga town Koz’modem’yansk for a permanent position in Mari Pedagogical Institute. In difficult war years he successfully combined pedagogical and scientific activity. The life conditions were not easy; there was need in everything. There was no not only electricity but even a kerosene. They had to prepare for lectures near an open door of a stove, under a flaring light of coals. When the coals burnt out, there remained to replay complicated mathematical calculations in mind’s eye. Exactly in those years A.F. Leont’ev fostered his ability to make a large mind work with no pencil and paper, to prepare for lectures and think over problem in his mind. The colleagues and pupils of Alexey Fedorovich were always delighted by this ability ...

In 1945 he moved to Moscow since he was accepted to doctoral courses in the Steklov Mathematical Institute. Alexey Fedorovich persistently and purposefully made his researches. At that, six people had to live in a small room. They slept not only in beds, but also on tables. As Alexey Fedorovich said, he had to prepare his doctoral thesis (Habilitation) at the light of a kerosene lamp employing stool instead of a table.

On February 19, 1948 there was a brilliant defense of the doctoral thesis “On a class of functions defined by certain series of Dirichlet polynomials”. The official opponents M.V. Keldysh, M.A. Lavrentiev and A.I. Markushevich recognized the thesis by A.F. Leont’ev as outstanding.

After the defense of the thesis, Alexey Fedorovich became a head of the department of the theory of functions in Gorky university and in 1954 he moves to Moscow. First he was a head of the department of higher mathematics and then the department of special courses of higher mathematics in Energy Institute. Since 1962, his main work position is in Steklov Mathematical Institute.

In 1970 Alexey Fedorovich was elected as a corresponding member of Academy of Sciences of USSR and in 1971, on invitation of the government of Bashkiria, he came to Ufa with a group of his pupils. Here he headed the sector of theory of functions in the Department of Physics and Mathematics (DFM) of Bashkir Branch of AS USSR and at the same time he was a head of the Department of the theory of functions and functional analysis in Bashkir University. From that time, a special period of his life began. The years of Alexey Fedorovich in the capital of Bashkiria were also wonderful for his environment: there arose a wonderful favorable media for discussions and mathematical art, especially for youth.

“In sixteen year of being in Ufa, Alexey Fedorovich made an impressive by its scale job. He

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<sup>1</sup>Cited by the book: “Outstanding scientists”, ed. Prof. A.D. Zorin. Volgo-Vyatskoe izd-vo, Gordy (1988). (in Russian).

obtained a huge amount of excellent scientific results, wrote four books, organized teaching of mathematical courses at the modern level, created post-graduated courses, initiated a city scientific seminar, prepared a big group of candidates and doctors of science, organized a council for defenses of theses. Finally, in Bashkiria, there was created and worked actively a powerful mathematical school having a high all-Union and international reputation. With no overstatement, all this selfless work by Alexey Fedorovich can be regarded as a scientific deed”<sup>1</sup>.

For sixteen year, each Tuesday, there was a city seminar on the theory of functions at the mathematical faculty of Bashkir University. Here the researchers of DFM, the lecturers of the Bashkir university and other universities, post-graduated students, students gathered together. The specialists with talks from other cities often came. For many of them this seminar became an initial point at their ways to the science. In a short time, thanks to the efforts by Alexey Fedorovich and his colleagues, the faculty of the university almost not known outside the Republic, was formed as a mathematical one in the full meaning of this word and became famous. And the core of the scientific and pedagogical staff of the faculty were graduates of the department of the theory of functions and functional analysis, the alumni of the Ufa school on the theory of functions founded by A.F. Leont’ev, who succeeded to overthrow in 10-15 years all deep-rooted views on mathematical science and a teaching level!

Before the jubilee, on March 24, 1987, the pupils of Alexey Fedorovich presented him a painting by the famous Gorky painter B.L. Bochkarev; in this painting, his native places were drawn: Oka river, Pozhoga pier, Sapun mountain . . . Alexey Fedorovich loved these places, he came there almost each summer . . . But in three weeks he passed away. And for the first time in 16 years, the seminar of the city seminar on the theory of functions was cancelled, this happened on Tuesday, April 14, 1987, at his death day. Like Euler, Alexey Fedorovich “stopped calculating and living”.<sup>2</sup>

Not tall, with a bright open face, a head a little bit reclinated to a shoulder, as if entirely embedded in the world of mathematics or likely thinking over something else, not less important, eternal . . . Such Alexey Fedorovich stayed in our memory.

30 years passed from that time. The members of the school of A.F. Leont’ev solved completely a series of world level problems: Ehrenpreis and Pólya problems, problem related with “Euler fundamental principle” and others. This happened thanks to the presence in Ufa of a serious mathematical school on the complex analysis created and moved to a high level by A.F. Leont’ev.

In the beginning of June 1987 there was the regular “All-Union simposium on the theory of functions”, which was the memory simposium.

B.Ya. Levin, the professor of Kharkov university, a first-rate specialist on the theory of functions, a participant of the simposium said: “Ufa mathematical school is young. Alexey Fedorovich had an attractive force for youth, he carried they with his favorite science so much that in several years after coming of Leont’ev to Ufa one started to speak about a big serious group of mathematics: their results were splendid from the beginning. And

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<sup>1</sup>Uspekhi Matem. Nauk. **42**:5(257), 177–182 (1987) (in Russian).

<sup>2</sup>Words by the secretary of the French Academy of Sciences Marquis of Condorcet concerning L. Euler (S.G. Gindikin, *Leonard Euler* // Kvant. 10, 17–24 (1983). (in Russian).

although Leont'ev worked mostly in the theory of functions, he gave a powerful incentive to the developing entire mathematics in the Republic ... I think, the time has come when a mathematical institute can be opened in Ufa ..."<sup>1</sup>

Yu.N. Frolov, a professor of Moscow Energy Institute said: "Alexey Fedorovich was a person with a rare innate talent. This seems to be his innate feature, an ability to mathematical studies. Apart of this, he was a big worker, he had a rare ability to work in any conditions. It is interesting that in summer, during the vacancy, Alexey Fedorovich "rested" in the way strange from the outside view: he solved problems underbuilding the base for further researches (exactly scientific results obtained in his Moscow dacha during the summer he presented at the his first seminar in the university, and this was every year, A.G.) ... And the mathematical institute is an old dream by Alexey Fedorovich, this would be wonderful if it comes true".<sup>2</sup>

And his dream came true: in the same year, on the base of DFM, there was created a mathematical institute and in February 1988, Institute of Mathematics with Computer center was opened officially and this institute functions successfully till our days.

Completing a brief survey of the activity by Alexey Fedorovich, we mention also that his studies surely enriched world science. He participated in International Congresses of mathematicians in Stockholm (1962), Moscow (1966), Vancouver (1974), Helsinki (1978), participated in international conference in Austria, Hungary, Bulgaria, lectured many times in Banach International Mathematical Center in Warsaw.

The works by Alexey Fedorovich are distinguished by the accuracy and clarity of presentation, by simple arguing and the results, as many recognise, impress by a deepness and completeness. They also possess one more rare advantage, which is the beauty, the main criterion, without which, as G. Hardy said, "there is no permanent place in the world for ugly mathematics."<sup>3</sup> First of all, this is "an exceptionally delicate and elegant theorem on singularities removing", a deep and effective theorem on construction of infinite order differential operator, which is a base for the main theorem on expansion of analytic in an "open domain" functions into the exponential series; theorems of wonderful beauty on quasi-analytic continuity and non-continuity and others.

Of course, the simplicity of theorems by Alexey Fedorovich is only apparent and the fineness and elegancy are achieved thanks to a talent and an every-day routine work by a scientist. Probably, " It may be very hard to define mathematical beauty, but that is just as true of beauty of any kind – we may not know quite what we mean by a beautiful poem, but that does not prevent us from recognizing one when we read it."<sup>4</sup>

These reasonings and conclusions of the famous English mathematician are coming up

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<sup>1</sup>R. Kurbangaleeva. *Delight of pure mind* // Vechernyaya Ufa. 137, 3 (1987). (in Russian).

<sup>2</sup>In the same publication. In his letter dated by November 24, 1986, and addressed to the Bashkir region committee of the party, justifying the necessity of creating an institute of mathematics in Ufa, A.F. Leont'ev stressed the value of fundamental studies in mathematics for the successful developing of the Republic. "The team of mathematicians in the Department already functions as an institute", he stressed. This letter was based on the decision of the commission of the Department of Mathematics of Academy of Sciences of USSR headed by Academician S.M. Nikol'sky, which in May 1986 assessed a high appraisal to the work of the mathematical departments of DFM (A.G).

<sup>3</sup>G. Hardy. *A Mathematician's apology*. Cambridge Univ. Press, Cambridge (1940).

<sup>4</sup>G. Hardy. The same book.

roses while judging the works by Alexey Fedorovich: as a rule, they have an aesthetical attractiveness, although a detailed study of his theorems and constructions with the most deep ideas requires many efforts, even they arouse an admiration of their beauty. He took arts with reverence, loved classical music, admired F.I. Shalyapin, adored the works by I.S. Kozlovsky. By his memories, in a big rural family, where Alexey Fedorovich grew up, the knowledges were appreciated very much, there was even a home choir! It was headed by his elder brother Vasili with a strong beautiful tenor ("as of Kozlovsky" (V.N. Phillipov)).

Alexey Fedorovich created an authoritative scientific school; among his pupils, there are 35 candidates of sciences<sup>1</sup>. A.A. Mirolyubov, V.P. Gromov, Yu.N. Frolov, I.F. Krasichkov-Ternovskii, V.V. Napalkov, A.M. Sedletskii, A.M. Gaisin are the most known doctors of sciences.

The teaching activity by Alexey Fedorovich of many years was as fruitful as his public activity. For many years, he was a member and a deputy of the head of an expert board of Higher Attestation Commission. He worked in specialized councils, for more than fifteen years he was an editor of the journal "Mathematical Notes", of Soviet-Hungarian journal "Analysis Mathematica", worked as a deputy of the head of the government of Bashkir branch of society "Knowledge".

Alexey Fedorovich was a strong patriot of the motherland. His merits were awarded by the medal "For valorous work" (1970), by Order of the Red Banner of Labour (1975) and by Order of the October Revolution (1987), by State Prize of USSR (posthumously, 1989).

He possessed rare qualities of character. Exceptionally modest, delicate, friendly, tireless worker, he was an example of attentive and kind treating of people around him.

*A.M. Gaisin*

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<sup>1</sup>By other information, 36 candidates of sciences including A.A. Ryabinin (1946 – 2003) who defended a doctoral thesis in 1999.