

MIKHAILO IOSIPOVICH YADRENKO

APRIL 16, 1932–SEPTEMBER 28, 2004



On September 28, 2004, the famous Ukrainian mathematician, Correspondent Member of the National Academy of Sciences of Ukraine, professor, Ukraine State Prize winner, Honored Scientist of Ukraine Mikhaïlo Iosipovich Yadrenko passed away.

M. I. Yadrenko was born on April 16, 1932, in the village of Drimailivka, in the Nizhin district of the Chernigiv region. In 1950, Mikhaïlo Iosipovich entered the Mechanics and Mathematics Faculty of the Kyïv Taras Shevchenko State University where he attended lectures of outstanding mathematicians, in particular, B. V. Gnedenko and I. I. Gikhman.

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He graduated from the university in 1955. In 1962, he defended his Ph. D. thesis entitled “Some problems in the theory of random fields” supervised by I. I. Gikhman.

From 1950 on, the life of M. I. Yadrenko was closely related to the Kyiv Taras Shevchenko University. After graduating from the university, he entered post-graduate studies at the same university (1955–1958). He started working at the Kyiv University in 1958 and did it till the end of his life. From 1966 to 1999, M. I. Yadrenko chaired the Department of Probability Theory and Mathematical Statistics. From 1999, he worked as professor at the same department.

M. I. Yadrenko was an outstanding mathematician and the author of fundamental results in both the theory and the statistical analysis of random fields. In fact, he was one of the founders of this theory. M. I. Yadrenko was awarded the M. M. Krylov prize of the National Academy of Sciences of Ukraine for a series of works in the theory of random fields. He is a Ukraine State Prize winner in the field of science and technique (2003).

Together with A. M. Yaglom, M. I. Yadrenko is considered to be a founder of the spectral theory of random fields. In 1961, M. I. Yadrenko and A. M. Yaglom obtained the spectral representation of a mean-square continuous homogeneous and isotropic random field. This result is contained in all well-known handbooks and monographs dealing with the theory of random fields.

In 1959, M. I. Yadrenko introduced [10] the notion of an isotropic random field on the sphere $S_{n-1}(1)$ in an n -dimensional Euclidean space; the correlation function of this field only depends on the angular distance θ between the points belonging to the sphere. He obtained the spectral representation of an isotropic random field on a sphere. In paper [24], M. I. Yadrenko introduced the concept of an isotropic random field in a finite-dimensional space; the correlation function of this field is invariant with respect to the group $SO(n)$. He obtained the spectral representation of this field and that of the correlation function.

Along with random fields defined on finite-dimensional spaces, M. I. Yadrenko also studied those defined on Hilbert spaces. He introduced the concept of an isotropic field on the sphere S_∞ in a Hilbert space and the notion of a homogeneous and isotropic random field on the whole Hilbert space and obtained their spectral representations. These results enabled M. I. Yadrenko to prove an ergodic theorem for random fields [25]. Spectral representations due to M. I. Yadrenko have been used in modeling random fields [62] and in studying some problems related to the invariance principle.

In 1958–1960, M. I. Yadrenko became interested in studying random fields having a certain “Markov” property [10]. Let μ be a family of sufficiently smooth Jordan surfaces ∂D . Each of these surfaces divides R^n into two parts, D^+ and D^- . M. I. Yadrenko studied fields $\xi(x), x \in R^n$, that have a Markov type property with respect to some families μ in the sense that, for any surface ∂D belonging to μ and for any $x_1 \in D^-$ and $x_2 \in D^+$, the random variables $\xi(x_1)$ and $\xi(x_2)$ are independent given the values of $\xi(x)$ on ∂D . For homogeneous and isotropic Gaussian fields, M. I. Yadrenko obtained necessary conditions for a field to have the Markov property that enabled him to construct examples of the Markov type fields. These results were widely recognized and stimulated creation of a new line of research, namely, that on generalization of the Markov property to random fields.

M. I. Yadrenko created effective methods of solving statistical problems for random fields: extrapolation, filtration, interpolation, and estimation of the regression coefficients. M. I. Yadrenko was one of the first to study analytic properties of random fields. He proved new theorems containing general conditions of the sample continuity with

probability one for random fields and calculated the modulus of continuity for these fields [18]. In [51, 52], local properties of homogeneous and isotropic random fields on R^n and on a sphere in R^n are studied in detail, and conditions for the spectral representations of these fields to be uniformly convergent are obtained. M. I. Yadrenko was the first to study conditions providing sample continuity of random fields on compact sets in a Hilbert space [19].

M. I. Yadrenko's papers [33, 42, 43] deal with studying absolute continuity and orthogonality of measures generated by homogeneous and isotropic random fields. Based on the spectral theory of random fields he created, M. I. Yadrenko obtained conditions for the absolute continuity and orthogonality expressed in terms of spectral characteristics of these fields.

We have mentioned only the main directions of M. I. Yadrenko's research on random fields. Many of these results were included into his monograph [3], later translated in the USA. We refer to paper [90] for a more detailed account of M. I. Yadrenko's results in the theory of random fields.

Mikhailo Iosipovich created and led a world-renown school on stochastic processes and random fields. There are 45 Candidates of Sciences (Ukrainian equivalent of a Ph.D.) among his disciples, 11 of them defended Doctoral theses (Ukrainian equivalent of habilitation). These are Correspondent Member of the National Academy of Sciences of Ukraine V. V. Anisimov, professors V. L. Girko, N. M. Zinchenko, A. N. Kachinskiĭ, O. I. Klesov, Yu. V. Kozachenko, M. M. Leonenko, M. P. Moklyachuk, I. K. Matsak, Yu. R. Popov, and D. S. Sil'vestrov.

M. I. Yadrenko was well known to be a brilliant teacher. His lectures were mathematically rigorous, logically structured, and combined a high scientific level with a clear presentation. There is no exaggeration in saying that a great number of Ukrainian experts in probability theory and mathematical statistics were initiated into these fields by M. I. Yadrenko's lectures.

Mikhailo Iosipovich published 24 textbooks and manuals on different mathematical subjects. One should mention the textbook *Probability Theory and Mathematical Statistics* [2] written together with I. I. Gikhman and A. V. Skorokhod and considered to be one of the best textbooks, and a collection of problems in probability theory [1] written together with A. V. Skorokhod, A. Ya. Dorogovtsev, and D. S. Sil'vestrov, published in English by the American Mathematical Society in 1997.

Mikhailo Iosipovich is one of promoters who introduced a new mathematical specialty in Ukraine, statistics. In 1997–2001, he led the wide-range international project “Statistical aspects of economics” in the framework of the TEMPUS–TACIS program of the European Community.

M. I. Yadrenko devoted a great deal of effort and much of his creative activity to bringing up talented young people in the field of mathematics. For more than 40 years he was a main organizer of school mathematical competitions at different levels. From 1970 on, he was at the head of the referee board at Ukrainian national school competitions in mathematics. For many years he lectured in mathematics for schoolchildren on Ukrainian television. M. I. Yadrenko founded the singular journal for schoolchildren *U Sviti Matematyki* (In the World of Mathematics) and remained its editor since 1970.

The above information does not exhaust by any means the list of multifold activities of M. I. Yadrenko. He was a vice president of the Ukrainian Mathematical Society and a member of the bureau of the Mathematical Section of the National Academy of Sciences of Ukraine. M. I. Yadrenko was one of the founders of the journal *Theory of Probability and Mathematical Statistics* and its deputy editor-in-chief.

We, disciples, colleagues, and friends of M. I. Yadrenko, always treated him with love and respect. He was an example to us of a person, scientist, and teacher. We are sure that the memory of this outstanding Ukrainian scholar will remain forever in Ukraine and all over the world.

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