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In memory of Ruslan Leont'evich Stratonovich

If he had had about five months more, Ruslan Leont'evich Stratonovich, a brilliant Russian scientist, would have celebrated his sixty-seventh birthday. But he died on January 13, 1997. A professor of the Moscow State University, he worked for science to self-oblivion from his days as a student to the end of his life. He never held any administrative posts, only went abroad for the first time in 1989, and was a member of one and the same department within the Faculty of Physics.

Professor Stratonovich was born in Moscow on May 31, 1930. In 1947 he passed his school examinations with a gold medal as an external student and entered Moscow State University (MGU)'s Faculty of Physics, from which he graduated in 1953.

We could have limited ourselves to citing his immaculate service record, his works, and his awards. But what really counts is that Professor Stratonovich was a man of unique intellect. He was equally at ease in unravelling subtle points of both theory and experiment. The scope of his interests was immense indeed, extending from the theory of vibrations and information theory to the theory of quantum measurements, from thermodynamics to the finest issues of the theory of stochastic processes and statistical physics. Mathematicians well know how proficient he was in the use of mathematical tools.

Endowed with innate talent, Professor Stratonovich could not only take his bearings easily in the above fields, but also made substantial contributions to each of them. His candidate's dissertation was more than just a rung in the ladder of promotions. It came to be the core of his first and now famous monograph *Izbrannye Voprosy Teorii Fluktuatsiĭ v Radiotekhnike* (Selected Topics of the Theory of Fluctuations in Telecommunications). It was published in this country in 1961 and in the United States in 1963 and 1967 under the title *Topics in the Theory of Random Noise* (vols. I and II). In this monograph he came up with what he then called a symmetrisation form of integral and differential expressions for Markov processes and the stochastic calculus based on it. This form now bears his name and is known in science on a par with the Ito stochastic calculus. But he kept on calling it 'the symmetrization calculus' to his last day.

A major contribution to science was his theory of conditional Markov processes he created in 1961 – 1965. It served as the basis for his doctoral dissertation and was later published as a monograph, *Uslovnye Markovskie Protsessy i ikh Primenenie v Teorii Optimalnogo Upravleniya* (Conditional Markov Processes and Their Application to the Theory of Optimal Control), in 1966 in the Soviet Union and in 1988 in the United States. This work met with a mixed response on the part of the scientific community in the Soviet Union. However, R Bellman, the founder of dynamic programming, had no doubts about the value of the results reported by Stratonovich. In the preface to the US edition of *Conditional Markov Processes and Their Application to the Theory of Optimal Control* (Elsevier, 1968), he wrote: "Stratonovich's book represents a major step forward in the current endeavor to create unified mathematical theories with wide ranging applications in both mathematics itself and in science".

Ruslan Leont'evich Stratonovich

Professor Stratonovich is credited with introducing into science such a global notion as the value of information. Thus, a link was established between the theory of information, on the one hand, and the theory of optimal statistical decisions and theory of optimal control, on the other. It was demonstrated that the theory of information and the theory

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of statistical thermodynamics share a common mathematical formalism.

In his last monograph, *Nelineĭnaya Neravnovesnaya Termodinamika* (Nonlinear Non-equilibrium Thermodynamics) (Nauka, 1985), Professor Stratonovich summed up the results of his work for more than two decades in this relatively young division of statistical physics. Among other things, he proved various new nonlinear fluctuation-dissipation theorems for the Markov, non-Markov, quantum, and non-quantum cases. These theorems generalise the well-known Nyquist and Kallen-Welton linear theorems to the cases of quadratic and cubic nonlinearities and have found, as demonstrated in this book with reference to numerous examples, many applications in various areas of physics and chemistry. Enlarged and revised, this book appeared in two volumes, in 1992 and 1994, as part of the Springer Series in Synergetics (vols. 57 and 63).

In his last years, Professor Stratonovich took strong interest in the quantum theory of measurements and wrote several important papers on the subject. In the same years, he made a series of very sophisticated and in-depth studies into the kinetic theory of systems with chemical reactions. He published a total of 7 monographs and 180 papers, being the single author of most of them.

Professor Stratonovich's contributions to science won him MGU's Lomonosov Prize in 1984, a USSR State Prize in 1988, and a Russian Federation State Prize in 1996.

Ruslan Leont'evich was remarkably diverse not only in his science interests. He loved and was well versed in Russian poetry, both classical and modern, wrote lyrics, was a connoisseur of painting, and could read fiction in four foreign languages. He was a true sports enthusiast: he went in for figure skating, tennis, and cycling. Sometimes he even went to work on his bicycle.

Ruslan Leont'evich was a person who fitted the Russian notion of intelligentsia in the noblest sense of the word. Being a scientist of world renown, he remained a true friend of his disciples with no effort on his part, thus setting an example of sincerity and simplicity in personal relations.

Those who knew Ruslan Leont'evich personally will always keep his pure image in their memories. His name will remain in the annals of science forever.

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