

Nalimov V V & Chernova N A. *Statistical methods for design of extremal experiments*. Ohio: Foreign Technology Division, Wright-Patterson Air Force Base, 9 January 1968. 412 p. FTD-HT-23-660-67. (Microfilm AD 673747.) (Translation of: Nalimov V V & Chernova N A. *Statisticheskie metody planirovaniya ekstremal'nykh eksperimentov*. Moscow, USSR: Nauka, 1965. 340 p. Also appeared in Polish translation: Nalimov W W & Czernowa N A. *Statystyczne metody planowania dos'wiadczen' ekstremalnych*. Warsaw: Wydawnictwa Naukowo-Techniczne, 1967. 412 p.) [Intrafaculty Lab. Statistical Methods and Chemical Dept., Moscow State Univ., USSR]

The book contains a detailed examination of complete factorial experiments and fractional replicas, steep ascension on the response surface, description of an almost stationary region, screening experiments, and adaptational optimization of industrial processes. The material is presented in the language of matrix algebra. [The SCI® and SSC® indicate that this book has been cited in over 835 publications.]

## The Development of Mathematical Experimental Design

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The book is a natural continuation of my previous book *The Application of Mathematical Statistics of Chemical Analysis*.<sup>1</sup> It was written under the influence of the outstanding papers by the American statistician G.E.P. Box.

The book is fairly popular. Special mathematical treatments related to experimental design are placed in isolated chapters. The material is illustrated by a vast amount of examples; many of them are borrowed from the research projects carried out in the laboratories where the authors used to work. Special attention is paid to physical-chemical interpretation of the research results. The book has an implicit epistemological tendency. One of the problems is

formulated as follows: Do simple polynomial models carry heuristic information?

The high citation rate of the book can be explained by the fact that the methods of experimental design it contains, due to their sufficiently high efficiency, were applied to many various domains of experimental research.<sup>2-6</sup>

Later, my interests and those of my colleagues concentrated on the study of a more profound formulation of the problem posed in the papers of the American mathematician J. Kiefer. [See, for example, reference 7.] His papers were of a purely theoretical nature. Our collective managed to demonstrate their practical applicability. We constructed compromise experimental designs meeting many optimality criteria. After the papers by Kiefer were published, it became possible to speak about the emergence of a new trend in mathematical experimental design.<sup>8</sup>

The series of publications was completed by the paper "Experimental design in Russian practice."<sup>9</sup>

For 10 years I worked side by side with Professor A.N. Kolmogorov as his deputy in the Intrafaculty Laboratory of Statistical Methods at Moscow State University. He used to say that our advantage was probabilistic thinking, but he never elucidated this statement. I share this idea. In my attempt to illuminate it, I wrote four books of a philosophical nature for ISI Press: *In the Labyrinths of Language: A Mathematician's Journey*;<sup>10</sup> *Faces of Science*;<sup>11</sup> *Realms of the Unconscious: The Enchanted Frontier*;<sup>12</sup> and *Space, Time, and Life: The Probabilistic Pathways of Evolution*.<sup>13</sup>

The books were reviewed many times, but the rate of citation is not high. The attempt to use probabilistic concepts so broadly was not supported. I wonder what the future has in store?

[Editor's note: Professor Nalimov's books that were published by ISI Press are available at STS Press, 102 Materials Research Laboratory, University Park, Pennsylvania 16802, telephone 1-814-865-1137.]

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11. \_\_\_\_\_. *Faces of science*. Philadelphia: ISI Press, 1981. 297 p. (Cited 15 times.)
12. \_\_\_\_\_. *Realms of the unconscious: the enchanted frontier*. Philadelphia: ISI Press, 1982. 320 p. (Cited 10 times.)
13. \_\_\_\_\_. *Space, time, and life: the probabilistic pathways of evolution*. Philadelphia: ISI Press, 1985. 110 p. (Cited 5 times.)

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