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Applied statistics and its development by Sergey Aivazian

Stan Lipovetsky
MASA Co-Editor-in-Chief, Minneapolis, MA, USA
E-mail: stan.lipovetsky@gmail.com

I had met Sergey Aivazian (hereafter referred to as SA), aka Sergey Artemievich (by the name and patronym, commonly used in Russian) in Moscow, circa 1975–1976. At the time, SA was already a well-known statistician, doctor of sciences, professor, as well as the head of the laboratory of probability and statistics in the Central Economics-Mathematical Institute (CEMI) of the Academy of Sciences. Meanwhile, as a physicist by education I could not find a job – instead, I started to work in economics as a mathematician/programmer who was supposed to develop some miracle statistical models to push and elevate the soviet economy. The first book I had read on the applied statistics was SA's "Statistical investigation on dependencies" and I loved it very much. Later I had read SA with co-authors' books on "Classification of multidimensional observations", "Typology of consumption", three volumes of "Applied Statistics", attended the seminars on "Multidimensional statistical analysis and probability modeling of real processes" which SA held in CEMI for many years. With all this new knowledge, I began to employ various statistical modeling and predictions for practical aims.

In that "stagnation" epoch of 1970–1990, the soviet economics had been weakly functioning under such unclear slogans as "Economics should be economical", but there was a belief that using mathematical and statistical modeling, computers and automatic systems of management could significantly improve the country's economic growth. However, there were strict ideological regulations and suspicion that "western" influences are disastrous for soviet life. For instance, the econometrics models were still defined as a "bourgeois" science serving the capitalists in their suppression of working class (a description of that time is given in my book Boulevard of Moebius. Lulu, 2019). The linear programming and interpretation of its dual solution as "shadow prices" was considered as an anti-Marxist view, and it was forbidden for its founder Leonid Kantorovich to attend the reception of his Nobel prize in 1975. I remember the 100-th anniversary meeting in honor of the Central Statistical Bureau journal "Statistical Bulletin" ("Vestnik Statistiki" in Russian) where the guards of soviet economics criticized the methods of multivariate statistics as "formalism". For instance, "Hilbert space" or even calculus was named harmful for national welfare – and SA had to defend those "modern" techniques as necessary and useful tools of statistical estimations.

In the 80s, when I had been preparing my Ph.D. thesis on mathematical methods at the Department of Economics, Moscow University (MGU), SA had become my adviser, after my first adviser Prof. Aron Yakovlevich Boyarski passed away. As the deputy director at CEMI and professor in MGU and other universities as well, SA was an extremely occupied and busy as a scientist and science coordinator. None the less, he was a really generous person I could always approach to discuss multivariate techniques, methods of index analysis, and whatever else I needed to clarify. Sometimes, I substituted for SA in lecturing for graduate students in MGU, and I was amazed how high his standards for teaching statistics were.

SA was always a key organizer in numerous meetings and conferences on applied statistics and probability, economics and econometrics, quality control in production, algorithms and software development, which were regularly held in various places of the USSR. For example, SA arranged them in Moscow and in Perm (the capital, and the Ural mountain, Russia), Tsakhkadzor near Erevan (Armenia), and Tartu near Tallinn (Estonia). I attended many conferences during the span of fifteen years, and presented multiple works there. SA had also suggested to publish my papers at various professional journals, such as "Industrial Laboratory" ("Zavodskaya Laboratoria"),

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"Economics and Mathematical Methods" ("Economica and Matematicheskie Metody"), and in the series of books of the selected works presented at the seminar in CEMI.

Many years later, in 2008, I served as the program chair for the marketing research section in the Joint Statistical Meeting (JSM) of the American Statistical Association. I asked SA to be an invited speaker in Denver, CO, at JSM attended by more than six thousand statisticians. Initially he had agreed and sent to me his resume in English, needed for presenting to JSM committee. However, he was so busy with his numerous works and obligations, that he changed his mind and could not spend time on such a vacation in the USA. However, I kept that his Curriculum Vita written by SA himself – and this document (slightly cleaned from some redundant detail) is given in the Appendix. It presents a valued list of the works and achievements of a prominent statistician of our time, a useful document for the history of sciences. Hard working, powerful, and energetic – Sergey Artemievich Aivazian always came across as an amazing person for anyone who ever met him.

Appendix

CURRICULUM VITAE of Sergey A. AIVAZIAN, Central Economics and Mathematics Institute (C.E.M.I) of the Russian Academy of Sciences (R.A.S), 2005.

1. Personal

Date of birth: June 24, 1934
Place of birth: Moscow, Russia.
Marital status: Married (wife – Tatiana AIVAZIAN), 2 children (Marianna and Natasha).
Citizenship: Russia.

2. Education

1957 – Graduated with distinction from Lomonosov's Moscow State University (diploma of the pure and applied mathematics).

3. Academic qualifications

1967 – PhD Diploma: Candidate of Physical and Mathematical Sciences; Thesis: "Comparison of the optimal qualities of the Neyman-Pearson's and Wald's statistical tests"; Advisors: Prof. A.N. Kolmogorov and Yu.V. Prokhorov (Steklov Math. Institute R.A.S.).

1975 – Diploma of the Doctor of Physical and Mathematical Sciences; Thesis: "Probabilistic-Statistical Modeling of the Social-Economics Processes and Some Problems of the Multivariate Statistical Analysis".

1978 – Graduation of the title "Full Professor".

1994 – Active Member of the International Higher Education's Academy of Sciences.

4. Areas of interest

Theoretical and Applied Econometrics: Multivariate Statistical Analysis, Data Analysis and its applications; macroeconometric modeling; probabilistic-statistical modeling of the mechanisms of the social-economics phenomenon's (distributary relations in the society, typology of consumption, forming of the preference functions, modeling processes of the expert's opinion forming); measuring and modeling the quality of life.

5. Position (scientific and pedagogical)

1957 – 1969: Research scientist at Steklov Mathematical Institute of the Russian Academy of Sciences.

1969 – at present: Chief of the Applied Statistics and Probability Laboratory of CEMI; beginning with 1985 - Deputy director of the CEMI RAS, Chief of the Econometrics and Applied Statistics Department.

1976 – at present: Professor of the Lomonosov's Moscow State University (Department of Economics), gives the courses of lectures: "Probabilities and Statistics", "Applied Statistics", "Multivariate Statistical Analysis", "Econometrics", "Econometrics-2", "Econometrics-3".

1992 – at present: Professor of the New Economic School (the course "Probability and Statistics").

1995 – at present: Professor of the Moscow State University of Economics, Statistics and Informatics (the courses "Econometrics", and "Econometric Modeling").

1996 – 1998: Professor of the California State University, School of Business and Economics (the course "Forecasting in Business").

1998 – at present: Professor of the Higher School of Economics (the courses "Multivariate Analysis" and "Bayesian Approach in Econometrics").

Visiting Professor: *1980* – University of Dijon (Economics and Mathematics Institute); *1996–1998* – Royal Holloway University of London (Computer Science Department).

6. Administrative positions

Deputy director of CEMI RAS (1985 – at present); President of Academic Council for Defense the Thesis (PhD); President of All-Russian scientific seminar "Multivariate Statistical Analysis and Probabilistic Modeling of Real Processes"; Head of Department Econometries and Mathematical Methods in Economics, Moscow School of Economics of the Lomonosov Moscow State University.

7. Professional societies

Member of the International Statistical Institute (1991–1996).
Member of the American Statistical Association (1994–1997).

8. Editorial activities

Vice-Editor-in-Chief of the Editorial Board (since 1986) of the journal "Economics and Mathematical Methods"; Member of the Editorial Board (since 1987) of the journal "Theory of Probability and its Applications"; Currently Consulting Editor (since 1980) of the Publishing House "Finansy i statistika"; Editor-in-Chief of the journal "Applied Econometrics" (since 2006).

9. Awards, honors

- Prize of the USSR Minister Counsel (1986).
- Prize and Medal of the French National Statistician Congress (1986).
- Medal of the European Econometrics Congress (Turkey, 1988).
- Honorary title "Merited Scientist of Russian Federation" (2002).

10. Invited papers and talks

Invited speaker at more than 20 international Conferences and Symposiums including:

- "Economics Structures and Econometrics" (Lyon, France, 1975, 1976).
- "Data Analysis and Informatics" (Versailles, France, 1979, 1981, 1985, 1989).
- "Probability Theory and Mathematical Statistics" (Vilnius, Lithuania, 1985, 1989, 1993).
- Congress of the World Econometrics Society (Toronto, Canada, 1975).
- Intelligent Data Management (London, Great Britain, 1996).

11. Main publications

[1] Comparison of the optimal properties of the Neyman-Pearson and the Wald sequential probability ratio test. "Probability Theory and its Applications", vol. 4 (1959), No. 1.
[2] Distinguishing of the approaching hypotheses about the density function form within the framework of the generalized sequential test scheme. "Probability Theory and its Applications", vol. 10 (1965), No. 4.
[3] Classification of the multidimensional observations. "Statistika", Moscow, 1974 (Russian) and "SNTL", Praha, 1981 (Slovakian).
[4] Statistical study of the relationships. "Metallurguia", Moscow, 1968 (Russian) and Edition "MIR", Moscow, 1970 and 1978 (French).
[5] Probabilistic-statistical modelling of the Distributary Relations in Society. In: "Private and Enlarged Consumption". North-Holland Publ. Comp. Amsterdam-New York-Oxford, 1976.
[6] Méthodes statistiques d'étude des dépendances entre variables classifiantes. "Publications Econometriques", vol. X (1977), No. 1, SYREY, Paris (French).
[7] Typology of the Consumption (with N. Rimashevskaya) "Nauka", Moscow, 1978 (Russian).
[8] Statistique mathématique appliquée et probleme de la stabilité des inferences statistiques. In: "Data Analysis and Informatics". North-Holland Publ. Comp., 1980 (French).
[9] On the construction of the automatic classification general theory. In: "Proceedings of the 1-st World Congress of Bernoulli Society ISI", VMU Science Press Utrecht, 1986.
[10] Applied Statistics: "Finance and Statistics", Moscow: vol. 1: Bases of Modelling and Initial Data Processing. 1983. vol. 2: Study of Relationships, 1985. vol. 3: Classification and Redaction of Dimensionality, 1989 (Russian).
[11] Eléments de modélisation et traitement primaire des données. "MIR", Moscou, 1986 (French).
[12] Teaching Probability and Mathematical Statistics at the Economics Department of Moscow State University. In: "Proceeding of the Conference on Teaching Statistics". ISI, Netherlands, 1991.
[13] Instruments Mathématiques et Logiciels pour Construction de Systemes Experts dans une discipline. In: "Proceeding of the Conference "Symbolic-numeric data analysis and learning", Nona Science Publishers, Inc., New York, 1991.
[14] Semi-Filled Shells and New Technology of the Subject-Oriented Statistical Expert Systems Construction. In: "Computational Statistics", vol. 2. – Springer Verlag Company, Heidelberg, New York, 1992.
[15] Modelling of the expert's opinion forming mechanism. In: "Economics and Mathematical Methods", vol. 30 (1994), No. 2 (Russian).
[16] Mixture-Model Cluster Analysis Using the Projection Pursuit Method. In: "Computational Learning and Probabilistic Reasoning", Ed. by A. Gammerman, John Wiley and Sons, Chichester-New York-..., 1997, pp. 227–286.
[17] Forming income per capita distribution model for Russian population of transition period. In: "Economics and Mathematical Methods", vol. 33 (1997), No. 4 (Russian).
[18] Consumption typology and income differentiation in Russian society of transition. In: "Review of Applied and Industrial Mathematics", vol. 4 (1997), No. 4 (Russian).
[19] Applied Statistics and Essentials of Econometrics. Moscow. 2-nd edition in two volumes, Unity, 2001 (Russian).
[20] Aggregative indicators of quality of life: constructing and utilization for social-economic management and comparative analysis. – Moscow, C.E.M.I. (RAS). 2000 (Russian).
[21] Poverty and Expenditure Differentiation of the Russian Population. – Economics Education and Research Consortium, Working Paper Series, No. 01/01, Moscow, 2001.
[22] Econometric Modelling of the Russian Economy. – "Acta Applicandae Mathematicae", vol. 78. pp. 3–19, Kluwer Academic Publishers, 2003.
[23] Toward a Methodology of Measuring of the Population's Life Quality Synthesized Categories. – In: "Economics and Mathematical Methods", vol. 39, No. 2, pp. 33–53, 2003 (Russian).
[24] Empirical Analysis of the Synthetic Categories of the Russian Population Quality of Life. – In: "Economics and Mathematical Methods", vol. 39, No. 3, pp. 18–52, 2003 (Russian).
[25] Russia in the Inter-Country Analysis of the Quality of Life Synthetic Categories. Part II: Analysis of Russian Trajectory at the Turn of Century (1995–2004). – In: "Univers of Russia", vol. XIII, No. 1, 2005 (Russian).

[26] Synthetic Indicators of Quality of Life and Sustainable Development: Construction and Utilization for Social-Economic Management and Comparative Analysis. – In: “Austrian Journal of Statistic”, vol. 34, 2005.

12. Languages

French (good) and *English* (fair capability to understand and to make oneself understood).