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To the 60th birthday of Zbyněk Šidák

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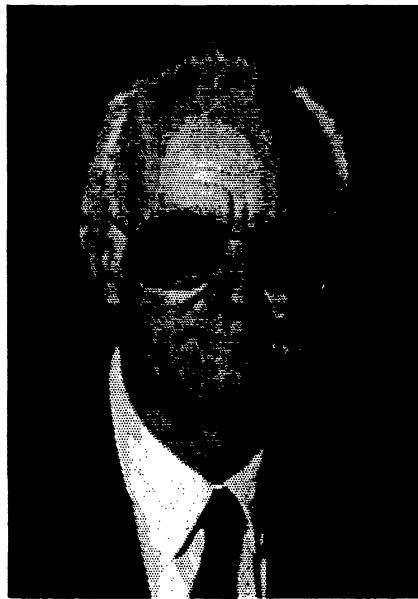
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NEWS AND NOTICES

TO THE 60th BIRTHDAY OF ZBYNĚK ŠIDÁK

JANA JUREČKOVÁ

RNDr Zbyněk Šidák, DrSc, who has been the Editor of *Aplikace matematiky* (now *Applications of Mathematics*) for unbelievable 25 years, was born on October 24, 1933, in Golčův Jeníkov. He entered Charles University in Prague, Faculty of Science in 1951 and continued his studies at Faculty of Mathematics and Physics when it was founded in 1952. He graduated in mathematical statistics in 1956, having not



interrupted his study even when he had to undergo a serious heart surgery in 1955. (In fact, all his life he has been suffering from heart troubles, and his work has been done in defiance of the fate.) His diploma thesis concerned martingales and semimartingales; notice that it was already in 1955!

After graduation, Šidák joined the Mathematical Institute in Prague (today a part of the Academy of Sciences of the Czech Republic), and has been working there since then, since 1988 as Head of the Department of Probability Theory and Mathematical Statistics. Without an advisor he worked on his CSc (PhD) thesis and defended it in 1961 (main part of it published in [3]); it concerned Markov chains and was a beginning of his pioneering work analyzing Markov chains from the points of view of both probability theory and functional analysis. His results on the classification and various properties of Markov chains based on operators in Banach spaces and on the study of pertaining eigenvalues, sub- and superharmonic functions, which appeared in a series of papers ([4], [5], [6], [7], [9], [11], [23]) and partially in his DrSc thesis (defended in 1973), are well known and widely cited. Equally well-known is his characterization of conditional expectations as operators in functional spaces (cf. [2]); some authors refer in this respect to “Šidák’s identity for operators” and to “Šidák’s operators.”

Another area of Šidák’s interest, in which he made important advances, was that of inequalities for multivariate probability distributions. For the multivariate normal distribution he proved in [10] the famous and often used “Šidák inequality” (sometimes referred to as the “Dunn-Šidák-Khatri inequality”) showing that the probabilities of rectangles under arbitrary correlations cannot be smaller than the analogous probabilities under independence of components. Later he generalized and extended this result (cf. [13], [14], [21]) and proved certain inequalities for other classes of distributions (cf. [15], [16]). These results became part of statistical monographs of many authors.

Practical applications of statistics in medicine led Šidák to the rank tests, and this was a lucky moment. Throughout the years he published several papers on rank tests, some containing tables of critical values (cf. [1], [17], [18], [19], [20], [22], [24], [25]). However, his most important contribution to this area is his joint monograph with Jaroslav Hájek entitled “Theory of Rank Tests” [8]. It appeared for the first time in 1967, the Russian translation in 1971, and then it was several times reprinted in the U.S.A. This outstanding book provides a systematic and rigorous but surprisingly natural and simple account of the rank tests on the highest level of exposition. Even today it provides the basic source of knowledge in the area and is often cited.

We have only touched the basic fields of Šidák’s scientific interest; moreover, he published papers in discriminant analysis (cf. [27], [29]), multiple decision procedures including ranking and selection (cf. [26], [28], [30]) and applications in biology and medicine (e.g., this led to [12]).

We should also mention his excellent activities in organization of science: *Aplikace matematiky* under 25 years of his editorship has been considered worldwide as a prestigious scientific journal. Moreover, in various years he was the main or-

ganizer of summer schools and conferences on cluster analysis, pattern recognition, data analysis, discriminant analysis, and he worked in Program Committees of the European Meeting of Statisticians 1979 and of COMPSTAT 1984. He has been a member or chairman of many scientific committees and boards. His high scientific reputation led to frequent invitations to foreign universities and institutes. In 1983 he was awarded by the Czechoslovak Academy of Sciences the Silver Bolzano Medal for Merits in the Development of Mathematics.

Šidák's outstanding and prodigious contributions have pushed the field of mathematical statistics and probability in important new directions. A very modest and honest person, he is held in high respect by his friends and colleagues.

SELECTED PUBLICATIONS OF ZBYNĚK ŠIDÁK

- [1] *with J. Vondráček*: Simple nonparametric two-sample test of location. *Aplikace matematiky* 2 (1957), 215–221. (In Czech.)
- [2] On relations between strict sense and wide sense conditional expectations. *Teor. Veroyatnost. i Primenen.* 2 (1957), 283–288.
- [3] Integral representations for transition probabilities of Markov chains with a general state space. *Czechoslovak Math. J.* 12 (1962), 492–522.
- [4] Operators in the space of continuous functions and representation of Markov processes in a compact Hausdorff space. *Czechoslovak Math. J.* 13 (1963), 37–50. (In Russian.)
- [5] Some theorems and examples in the theory of operators in denumerable Markov chains. *Čas. pěst. mat.* 88 (1963), 457–478. (In Czech.)
- [6] Eigenvalues of operators in denumerable Markov chains. In: *Trans. 3rd Prague Conf. on Inform. Theory, Statist. Decis. Functions and Random Processes.* Academia Prague, 1964, pp. 641–656.
- [7] Eigenvalues of operators in ℓ_p -spaces in denumerable Markov chains. *Czechoslovak Math. J.* 14 (1964), 438–443.
- [8] *with J. Hájek*: *Theory of Rank Tests.* Academia, Prague & Academic Press, New York, 1967; Russian translation: Nauka, Moscow, 1971.
- [9] Classification of Markov chains with a general state space. In: *Trans. 4th Prague Conf. Inform. Theory, Statist. Decis. Functions and Random Processes.* Academia Prague, 1967, pp. 547–571; Research Announcement: *Bull. Amer. Math. Soc.* 72 (1966), 149–152.
- [10] Rectangular confidence regions for the means of multivariate normal distributions. *J. Amer. Statist. Assoc.* 62 (1967), 626–633.
- [11] Eigenvalues of operators in L_p -spaces in Markov chains with a general state space. *Czechoslovak Math. J.* 17 (1967), 148–157.
- [12] On the mean number and size of opaque particles in transparent bodies. In: *Studies in Math. Statist., Theory and Applications.* Akadémiai Kiadó, Budapest, 1968, pp. 161–168.
- [13] On multivariate normal probabilities of rectangles: Their dependence on correlations. *Ann. Math. Statist.* 39 (1968), 1425–1434.
- [14] On probabilities of rectangles in multivariate Student distributions: Their dependence on correlations. *Ann. Math. Statist.* 42 (1971), 169–175.
- [15] A chain of inequalities for some types of multivariate distributions, with nine special cases. *Aplikace matematiky* 18 (1973), 110–118.

- [16] On probabilities in certain multivariate distributions: Their dependence on correlations. *Aplikace matematiky* 18 (1973), 128–135.
- [17] Tables for two normal-scores rank tests for the two-sample location problem. *Aplikace matematiky* 18 (1973), 333–345.
- [18] Tables for two normal-scores rank tests for the two-sample scale problem. *Aplikace matematiky* 18 (1973), 346–363.
- [19] Tables for the two sample Savage rank test optimal for exponential densities. *Aplikace matematiky* 18 (1973), 364–374.
- [20] Applications of random walks in nonparametric statistics. *Bull. ISI, Proc. 39th Session in Vienna*, 45 (1973), no. 3, 34–42.
- [21] A note on C.G. Khatri's and A. Scott's papers on multivariate normal distributions. *Ann. Inst. Statist. Math.* 27 (1975), 181–184.
- [22] Tables for the two-sample median test. *Aplikace matematiky* 20 (1975), 406–420.
- [23] Miscellaneous topics in Markov chains with a general state space. In: *Trans. 7th Prague Conf. on Inform. Theory, Statist. Decis. Functions and Random Processes, Vol. A.* Academia Prague, 1977, pp. 531–544.
- [24] Tables for the two-sample location E -test based on exceeding observations. *Aplikace matematiky* 22 (1977), 166–175.
- [25] *with S. Hojek*: Monte Carlo comparisons of some rank tests optimal for uniform distribution. In: *Contributions to Statistics (J. Hájek Memorial Volume) (J. Jurečková, ed.)*. Academia Prague & Reidel Dordrecht, 1979, pp. 233–238.
- [26] Selection of the best of several multivariate normal distributions. In: *Proc. 3rd Prague Symp. on Asympt. Statist.* (P. Mandl, M. Hušková, eds.). Elsevier Sci. Publ., 1984, pp. 131–144.
- [27] Some distribution-free discrimination procedures for circular data. In: *Proc. DIANA II.* Math. Inst. Czechosl. Acad. Sci., Prague, 1987, pp. 241–248.
- [28] A sequential procedure for selecting the better of two trinomial populations. In: *Proc. 4th Prague Symp. on Asympt. Statist.* (P. Mandl, M. Hušková, eds.). Charles University Prague, 1989, pp. 491–497.
- [29] Nonparametric discrimination of response curves and discrimination of permutations. In: *Proc. DIANA III.* Math. Inst. Czechosl. Acad. Sci. Prague, 1990, pp. 243–250.
- [30] *with O. Šidák*: Strategies for a sequential selection of the better of two trinomial populations. *Comm. Statist. – Simul. Comp.* 21 (1992), 1171–1180.