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Igor Kluvánek (1931--1993)

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On July 24th, 1993 Professor Igor Kluvánek died in Bratislava. We have an unpleasant duty to comment on this event, but we also have an occasion to remember the work and life of Igor Kluvánek.

Igor Kluvánek was born on January 27th, 1931 in Košice. He was awarded his first degree, in electrical engineering specializing in vacuum technology, at the Slovak University of Technology, Bratislava, in 1953. His first appointment was in the Department of Mathematics of the same institution. At the same time he worked for his CSc. degree, received then from the Slovak Academy of Sciences. In the early 60's he joined the Department of Mathematical Analysis of Šafárik University of Košice. During 1967-68 he held a visiting position at the Flinders University of South Australia. The events of 1968 in Czecho-Slovakia and some unusual coincidences created circumstances making it impossible for him and his family to return to their homeland. The Flinders University was able to create a chair in applied mathematics to which he was appointed in 1969 and has occupied until his resignation in 1986. Then he worked as a scientific researcher at the Centre of Mathematical Analysis of the Australian National University in Canberra. In 1989 he returned to Slovakia and received the degree of Professor from the President of Czech and Slovak Federal Republic. He was lecturing at Comenius University in Bratislava, at the University of Transport and Telecommunications in Žilina, and at the Slovak University of Technology in Bratislava. During his stay in Australia he held visiting positions at the Department of Mathematics in Pittsburg, Department of Statistics at the University in North Carolina, Department of Mathematics in Illinois, and the Department of Mathematics in Saarbrucken.

Scientific activities of Professor Kluvánek can be divided into three areas: vector measures and integrals, non-absolutely convergent integrals, and harmonic analysis.

In the "classical", i.e. sigma-additive measure, he gave a definitive answer to the problem of constructing a vector measure. His result is presented in [1] as the Carathéodory-Hahn-Kluvánek theorem. In the spirit of this result many basic achievements have been realized in different directions.

Professor Kluvánek formed the theory of vector Daniell integral. He solved the problem of trigonometric moments for vector measures and successfully applied the solution in the spectral theory of operators.

Further he introduced the notion of a closed measure, i.e. a measure inducing a complete space of integrable functions. This notion has been used in solutions of many problems. E.g., I. Kluvánek characterized the closed convex hull of the range of a vector measure. By the help of this result G . K n o w l e s extended the classical Ljapunov theorem into the spaces of infinite dimension. On the other hand, W. Ricker used it for the study of spectral measures.

In the theory of non-absolutely convergent integrals I. Kluvánek realized the first steps towards unifying the theory of divergent series and integrals of functions of a continuous variable. He introduced the notions of the integrating deviation and integrating seminorm. This notions permitted him to study complete spaces of "integrable" functions similar to the functional spaces introduced and studied by Aronszajn. These notions seem to be fruitful in

several directions, mainly in the theory, of the stochastic integral. in the spectral theory and in the theory of defects of semigroups. Indeed, the results in the spectral theory and in the defect theory achieved by I. Kluvánek, show new possibilities which were not accessible by the classical methods.

The third area of interests of Professor Kluvánek lies a little out of the directions determined by the previous results. He generalized, for locally compact Abelian groups, the well-known Whittaker-Kotelnikov-Shannon theorem on the interpolation of functions with a bounded spectrum. This result has been used in the theory of signal translation in artificial and natural communication channels.

Professor Kluvánek became one of the world leaders in integration theory. He practised integration thoroughly from abstract theory to concrete applications, and his work consistently blends these two together. He was the first mathematician who understood and solved basic problems of vector measures theory. He applied his work to infinite dimensional control, with his work on Ljapunov theory and the bang-bang principle. More recently, he successfully attacked the problem of integration with respect to measures of unbounded variation. This work may well be the right framework for the study of the Feynman integral.

His papers and books are characterized by a clear motivation and an encouragement to attack difficult problems, by their elegance and an ability to find substantial circumstances of problems. He was exacting to himself and to his students; a number of them he educated in abroad as well as in Slovakia. Here is the list of foreign PhD students of Professor Kluvánek: A. Geue, B. Jefferies, S. McKee, G. Knowles, C. Meaney, S. Morris, R. Nillsen, S. Okada, W. Ricker, M. Sears, A. K. Whitford. Many of them belong now to important scientific personalities.

A great interest was attracted by the book [6], but also by some other results commented e.g. in the monographs [1], [2], [3]. In this connection, the review article [4] is interesting as well as the comments in the proceedings [5].

Prof. Kluvánek created an original pedagogical work. It started with the two volume textbook [7], [8], which was a turn in teaching mathematics at Czech and Slovak technical universities. His final pedagogical work is a still unpublished extensive university course, very well organized and reasonable from theoretical as well as methodical points of view. He also wrote lecture notes (in Slovak), with M . K o v a ř í k o v á and Z . K o v a ř í k, on the first year university analysis, and a popular book (also in Slovak), with L . B u k o v s k ý, on the pigeon-hole principle.

The work and life of Professor Igor Kluvánek present a significant contribution to Slovak mathematics and Slovak culture, but not only to them. His results will remain permanently in the foundations of mathematics, and his life will serve as an example of honesty and uncompromising attitudes.

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