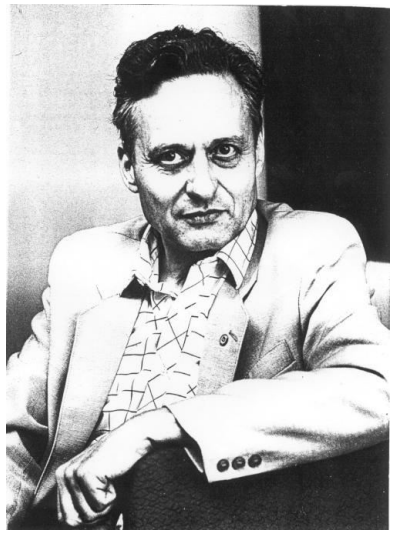
OBITUARY: *Klaus Matthes*



Klaus Matthes

Klaus Matthes died of cancer on March 9, 1998, after a long illness, throughout which he continued to work. He died in Berlin, the city in which he was born, had undertaken his mathematical studies, and, from 1974 to 1990, had directed the East German Academy's 'Karl Weierstrass' Institute of Mathematics. He is survived by his wife and two sons.

Klaus Matthes was born on January 20, 1931, the first of five children. His first mathematical speciality was abstract measure theory, in which he earned both German doctoral degrees. Like several other German mathematicians of the time, in the early 1960s he turned his attention to probability. At the University of Jena, where he was faculty dean from 1963 to 1967, he worked on point processes and their applications to queueing theory.

In his papers of this period, Matthes developed fundamentals of the theory of point processes. Together with Kerstan, he studied limits of superpositions of point processes. This led him to a systematic investigation of infinitely divisible point processes; together with his co-workers he discovered an analogue of the Levy canonical measure from infinitely divisible random variable theory. (This is now called the 'KML measure' after Kerstan, Matthes and Lee.) This result permitted the development of a structure theory for infinitely divisible point processes, which turned out to be, in some sense, projections of Poisson point processes defined in a phase space of clusters. This research culminated in the early 1970s in the publication of the comprehensive monograph on point processes by Kerstan, Matthes and Mecke, later translated (in extended form) into English (1978) as *Infinitely Divisible Point Processes*, and Russian (1982).

The work on infinitely divisible point processes was closely connected with the model of spatial branching processes, where spatial points generate spatially distributed daughter points which in turn have daughters, and so on. This research topic occupied Matthes for the rest of his life; a last co-authored paper was submitted for publication in 1999. The problem

of existence of equilibria, and the study of properties of equilibrium distributions, such as mixing, played a central role. In 1988, results relating to this theory were summarized in the monograph by Liemant, Wakolbinger and Matthes, *Equilibrium Distributions of Branching Processes*. Together with Mecke and Warmuth, Klaus Matthes also made important contributions to the research programme seeking to recast statistical mechanics in terms of stationary point processes.

Following Sevastyanov's paper of 1957, a series of publications in queueing theory by various authors demonstrated the phenomenon of 'insensitivity', where the stationary state probabilities of a system do not depend on the exact specification of some component distribution such as the service time distribution in Erlang's loss system. Matthes developed the concept of 'service schemes' (later renamed 'generalized semi-Markov processes' by Schassberger), in order to establish whether a system has insensitivity properties without applying the method of supplementary variables. It turned out that some 'refined' balance equations must have a unique solution. Today, many systems exhibiting these properties are known, including important network queues. A further, rather difficult, result due to Matthes, which seems to merit more attention than it has so far attracted, concerns loss systems with dependencies of service and interarrival times. This was an important early application of marked point processes to queueing.

Together with Kerstan and Mecke, Klaus Matthes founded the East German school of point process research. Today, whenever we use the symbol Φ to denote a generic point process, we follow notation introduced by Matthes. He inspired and attracted many active mathematicians, and was rewarded by the resulting spread of his concepts into areas such as queueing, reliability, stochastic geometry, branching processes, particle systems, and (mathematical) statistical physics.

In the wider development of stochastics and mathematics in the former German Democratic Republic, Klaus Matthes played an important role. Under his directorship, the Karl Weierstrass Institute gained international mathematical recognition. It attracted many gifted young mathematicians, and developed a broad spectrum of research areas in both pure and applied mathematics. Today, as one of the few institutes of the former Academy to survive the dissolution of the GDR, it operates under the title of Weierstrass Institute for Applied Analysis and Stochastics (WIAS), and maintains the same level of staffing as formerly.

Klaus Matthes conceived of his activities as dean, and still more importantly as director of the Institute, as having a political dimension. To understand this, one must appreciate the deep impression made upon him as a young man by the events of World War II and the immediate post-war years. In his view, the GDR embodied humane and progressive ideals in a state which he actively served and whose politics he consciously supported. As a result, there was little common ground with those colleagues whose experience had been of political persecution, or whose professional development had been hampered by *Kaderpolitik*. Others, however, remember with gratitude his support and understanding in difficult times. It is not perhaps farfetched to associate the shipwreck of his ideals on the collapse of the GDR, with a subsequent decline in his physical powers.

Before Matthes was attacked by cancer, he was known for his superlative health and energy and as a veritable workaholic. In his scientific work, he was always attracted by the deepest and most complicated problems, which he tended to approach from a structural standpoint. In his role as institute director, subjected to pressures of time, the most accessible presentation of his research was not always an option available to him, and his thoroughness, complicated exposition, and use of extended notation have, to some, reflected an older, 'Germanic' tradi-

tion. In the original German edition of his monograph on infinitely divisible processes, for example, Matthes exhausted in turn the Roman, Greek and Gothic alphabets before enlisting the Cyrillic! Notwithstanding this, one of his characteristic remarks was that 'mathematics is the art of making problems simple'.

Klaus Matthes was a brilliant speaker and an enthusiastic academic teacher, a cultured man with a profound knowledge of classical philology. Mainly by listening to recordings and radio transmissions, he acquired an extensive knowledge of classical and modern music. He was very much interested in history, particularly in the roles of those who had 'made history'; a favourite subject for discussion was problems in world politics. Seen against the background of the complex and ambiguous period in which he lived, Klaus Matthes will be remembered as an outstanding mathematical scientist with deep roots in European culture.

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