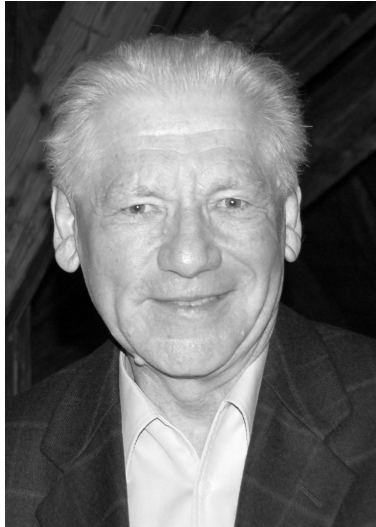# In Memory of Lothar von Wolfersdorf

Lothar von Wolfersdorf

After a long and hard fight against cancer, Lothar von Wolfersdorf passed away on November 30, 2010, at the age of 76.

Lothar von Wolfersdorf received his diploma degree in Mathematics from the Martin Luther University Halle–Wittenberg in 1957, where he also finished his doctorate under the supervision of Hans Schubert (1908–1987) in 1961. After an employment in an institute for data processing and computing in Dresden, where he investigated problems of mathematical optimization and their applications, he received a position as scientific assistant at the Institute of Applied Mathematics of the Freiberg Mining Academy (Technische Universität Bergakademie Freiberg). He worked there from his habilitation on a topic in game theory in 1966 until his retirement in 1999. Lothar von Wolfersdorf was appointed associate professor (Dozent) in 1967, full professor of mathematical control theory in 1971, and full member of the Saxonian Academy of Science in 1991.

In 1992, at the very beginning of the transition of the East German university system to that of the unified Germany, he was instantly appointed to a full

professorship in Applied Analysis. In view of his political integrity and scientific excellence he was asked to play a leading role in the re-organization of his mathematical institute. He accepted this difficult, delicate, and demanding task and coped with it in an admirable way.

Lothar was interested in a wide variety of problems of Applied Analysis. He started his scientific career by research on the Tricomi equation of transonic flow. To read Tricomi's work, he learned some Italian. His first paper was published in Russian, in *Izv. Vyssh. Uchebn. Zaved., Mat.*, vol. 26 (1962). All his scientific life, he continued to investigate integral equations and partial differential equations (PDEs) of Mathematical Physics. For instance, this led to many contributions to Sjöstrand problems for PDEs of mixed type, generalized Abel integral equations, Hadamard problems, Noether operator equations, singular integral equations, Wiener-Hopf equations, and autocorrelation equations.

Later, Lothar became interested in the theory of nonlinear PDEs. To name only a few topics, he has been working on monotonicity methods for nonlinear elliptic boundary value problems, nonlinear Riemann-Hilbert problems for analytic functions, and the Satsuma-Mimura diffusion equation.

Optimal control and inverse problems were among Lothar von Wolfersdorf's favorite topics. He started this research by some contributions to continuous games with butterfly kernels. Then he approached optimal control by results on minimax problems, and soon became one of the leading German experts in this field. In the 1970s, he published various papers on the control of Fredholm and Hammerstein integral equations and Noether operator equations.

One of the central results of optimal control theory is the celebrated Pontryagin maximum principle. Lothar von Wolfersdorf was able to prove this principle for the control of semilinear parabolic PDEs with pointwise control constraints. He applied a general approach, suggested by Leonhard Bittner, and used an integral equation method to define the weak solution of the PDE. Restricted to submit his papers to mathematical journals in the East, he published this ground breaking result in *Zeitschrift für Angewandte Mathematik und Mechanik (ZAMM)* 56 (1976) and 57 (1977). Therefore, many in the today's community of PDE control do not know that these papers contain the first proof of the Pontryagin principle for the considered class of PDEs. In *ZAMM* 60 (1980) he also presented a counterexample to the Pontryagin principle for a class of distributed parameter systems.

In the 1980s, nonlinear boundary value problems for holomorphic functions came into the focus of his research. Using ideas from monotone operator theory, functional analysis, and various fixed points principles, he made important contributions to the theory of nonlinear Riemann-Hilbert and Riemann-Hilbert-Poincaré problems and their applications in hydrodynamics and seismics.

From the late 1980ies on, Lothar von Wolfersdorf addressed also inverse and ill-posed problems. Very fast he became a top expert in this field and promoted its theory and application. First, he discussed identification problems for heat transfer, electromagnetic fields and seismic waves. Later, beginning with the

1990s, he actively contributed to identification of memory kernels. His novel ideas were later applied by others to optimal shape design.

Lothar was always involved in applications of his mathematical research. He established contacts to colleagues of engineering faculties for associated scientific cooperation. In collaboration with his team members and engineers, he solved identification and control problems in the heat treatment of steel. He also worked on identification problems in geophysics. Already being faced with his deadly disease, he was able to contribute significant results to control problems of medication in cancer treatment.

After retiring in 1999, Lothar continued his successful research and published more than 40 further articles. Altogether, he wrote more than 200 papers with about 20 co-authors. Mathematics was all the time his main passion. A few days before he died, he finished a small paper on games, thus returning to one of his early topics of research. He sent it to some collaborators and friends. It was his very touching way to say goodbye to his colleagues.

The community of Applied Analysis and Control Theory has lost a great scientist and many of us mourn for a very good friend. He was a wonderful person who promoted students, co-workers and colleagues in an ideal way. All who had the pleasure to know him, enjoyed his attitude and personality. We are proud to belong to the big family of Lothar's academic pupils. We miss him, but his ideas will continue to guide our mathematical work.

The photo, taken by Albrecht Böttcher, shows Lothar von Wolfersdorf at the Workshop on Advances and Trends in Integral Equations, held at Wasserschloss Klaffenbach in Chemnitz in October 2009.

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