

**LIFE AND WORK OF
PROFESSOR GUNNAR KANGRO
(21.11.1913–25.12.1975)**

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“Professor Gunnar Kangro, member of the Estonian Academy of Sciences, was the most famous Estonian mathematician of his time. He was a world-class professional in his main research area – summability theory. His excellent courses and textbooks in algebra and analysis advocated the use of new theories developed in the first half of the twentieth century, and led the transition of Estonian mathematics to modern basis. His lecture courses in functional analysis gave also momentum to the research in numerical analysis in Estonia. Having supervised 23 Cand. Sc. theses, he is fully considered the founder of contemporary Estonian mathematical school.”

In our talk we will try to open this superlative summary of the life and the work of professor Gunnar Kangro (given on the homepage of our conference) in a more detailed way, basing on the factual materials introduced below.

Gunnar Kangro was born in 1913 in Tartu, in the family of a successful building contractor and architect. He graduated from the Tartu Real Gymnasium in 1931 and the same year started his mathematics studies at the University of Tartu. His father Fromhold Kangro had bankrupted by that time, and thus he was in serious economic difficulties during his student years. After graduating from the university and passing the regular military service he was employed by Tallinn University of Technology in 1936 as an assistant. In 1938 he defended his master thesis on polynomial series written under supervision of professor H. Jaakson. Soon after that he started working on his doctoral thesis, being supported by a 2-years scholarship 1940–1941. The scholarship was closed down in the end of 1940, shortly after Estonia was incorporated into the Soviet Union. Kangro’s work on doctoral thesis was interrupted by the beginning of the war between the Soviet Union and Germany. In July 1941 he was forced to join the Red Army. Thanks to the help of professor J. Nuut, he was transferred back to scientific work in February 1942, first to Chelyabinsk, later to Moscow, where he continued his research on doctoral thesis. In 1944, after the war was over in Estonia, he returned home and started his

work at the University of Tartu as a mathematics docent (associate professor). In 1947 he defended his doctoral thesis. In 1951 he was appointed to the position of mathematics professor at the University of Tartu. He worked there as a professor and a head of chair till the end of his life. First, in years 1952–1959 he was the head of the chair of geometry, and later the head of the chair of analysis. In 1961 he became a corresponding member of the Estonian Academy of Sciences.

In 1951 he married Hilja Puskar who had just graduated from the faculty of medicine. Hilja and Gunnar got two daughters – Källiki (1954) and Anu (1957). Both of them became medical doctors following in their mother's steps, and Cand. Sc. in medicine following in their father's steps.

Basic developments in mathematics during the first half of the last century involved big changes in teaching mathematics at universities. Gunnar Kangro had the main responsibility for these changes at the University of Tartu. Thus, he built up new modern courses in algebra and analysis. He was one of the first professors in the Soviet Union who taught the course of functional analysis which turned out to be a starting point for a new research direction in Estonia, the theory of numerical methods. Professor Gunnar Kangro became a recognized leader of the after-war-time mathematical community of Estonia. Under his leadership also the research directions, where he himself was not active (e.g., numerical methods, algebra, geometry) were developed. He wrote the excellent university textbooks in algebra and analysis.

Research of G. Kangro himself was mainly carried out in the theory of summability of series and sequences. In the early years of his work this theory was called the theory of divergent series. His doctoral thesis was based on the ideas of É. Borel. On this basis he created the new convergence theory which included the Borel's theory and could be applied in investigations of convergence of power series. He introduced new summability methods and applied them for solving problems of convergence and analytic continuation of power series. In the nineteen fifties, in parallel with German mathematicians A. Peyerimhoff and W. Jurkat, G. Kangro built up a basis for systematic study of summability factors. It is characteristic to his research methodology that he combined methods of functional analysis with classical methods of analysis. Together with his student S. Baron he started describing summability factors of double series, giving this way an impulse for investigations of summability of double series.

The applications of summability theory to orthogonal series and problems related to Tauberian theorems motivated him to found in the years 1960–1970 the theory of summability with speed. Within the framework of this theory he succeeded in solving several problems of the theory of summability and of the theory of functions. Founding this new theory based on functional analysis, he also pointed out the

main possibilities of its applications. His work was interrupted by his death in 1975.

Doubtless, the main contribution of professor Kangro was bringing up a new generation of Estonian mathematicians. Under his supervision 23 candidate (i.e., PhD) theses in mathematics were defended, majority of them in summability theory. This is why we can talk about Tartu Summability School.

Professor G. Kangro was a great personality. Supervising his students in writing their theses he also formed their beliefs and ways of life. His students remember him with love and deepest respect, carrying on his mathematical and human legacy.

Professor G. Kangro is buried in the Raadi Cemetery of Tartu.

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