



NODAR BERIKASHVILI'S 90TH BIRTHDAY ANNIVERSARY

This year we celebrate the 90th anniversary of birthday of Nodar Berikashvili, widely recognized famous Georgian mathematician, one of the founders of the Georgian topological school.

He was born in 1929. Upon graduation from the Tbilisi State University in 1952, he continued his education in a post-graduate course (PhD student) under the supervision of academician George Chogoshvili. Nodar Berikashvili's dissertation (PhD thesis) attracted attention of the world famous scientist, topologist Peter Alexandrov, who invited young Nodar Berikashvili to work at Steklov Mathematical Institute in Moscow. Nodar Berikashvili defended his PhD degree at the same Institute and worked there till 1959. Of interest is the fact that on the sites of Steklov Institute and Moscow State University the name of Nodar Berikashvili is listed among prominent scientists.

In 1959, he comes back to Georgia and starts his work at A. Razmadze Mathematical Institute of the Georgian Academy of Sciences, at the Department of Geometry and Topology founded by academician George Chogoshvili. In 1971, he defended his Doctor's degree at Steklov Institute, and in 2001 he was elected the member of Georgian Academy of Sciences.

Besides his scientific activity, Nodar Berikashvili was deeply involved in the pedagogical activity, he was lecturing at Tbilisi State University and was supervisor of PhD students at A. Razmadze Mathematical Institute.

Below we present a brief survey of Nodar Berikashvili's scientific works.

The first cycle of his works is dedicated to the homology theory of general spaces. Namely, N. Berikashvili continued the approach suggested by his supervisors G. Chogoshvili and P. S. Alexandrov, the duality theory, which in Berikashvili's works achieved its complete form. Towards this end, Berikashvili has constructed some new homology theories and developed axiomatic theory for limits of spectra. All these works place N. Berikashvili among the founders of the homology theory of general spaces.

The second cycle is concerned with the index theory for singular integral equations, the field, traditional for Georgian mathematics. In 1963, using topological methods, N. Berikashvili has proved the index formula for an arbitrary 2-dimensional manifold, proven earlier by Wolpert for 2-spheres. Approximately, at the same time, the famous Atiah-Singer theorem has been proven, which generalized these results.

The next cycle of N. Berikashvili's works is an important contribution to one of the most powerful tools of algebraic topology, the Lere-Serre's spectral sequences. N. Berikashvili's theory of predifferentials strengthened essentially this method and enriched it by a new computational potential.

The predifferential theory is based on the new homotopy invariant, i.e., on the functor D , which uses not only cocycle information from the cochain complex of a space (as the homology functor does), but also the so-called twisting cochains, thus this functor is more informative, than the homology functor is. For example, it perceives Hopf's invariant. For a large class of spectral sequences including the spectral sequences of fibrations and coverings, N. Berikashvili has constructed the so-called "predifferential", an element of the functor D , which determines all differentials and extensions in the corresponding spectral sequence, thus it completely reconstructs the limit.

This method demonstrates the connections between various methods of investigation of the homology theory of fibrations: the method of spectral sequences of Lere-Serre, the Hirsch method and Brown's theory of twisted tensor products. Moreover, the predifferential theory develops and generalizes these methods. The Hirsch method is developed in the sense that it negates the restriction about the freeness of homology, N. Berikashvili replaces the nonfree homology by its free resolution, the novelty for that time, besides, the Hirsch method has been extended to the spectral sequences of coverings. Brown's method is developed in the sense that there was introduced the organization in a set of twisting cochains allowing one to choose a twisting cochain in a more simple form for calculation of homology of a fibration.

In the 70-80th of the past century, the predifferential theory achieved essential refinement and was developed as a powerful tool for modeling of spaces and fibrations. N. Berikashvili has constructed new versions of the functor D which determine the multiplicative structure and high rank Steenrod operations.

At present, using his methods, N. Berikashvili is engaged in the central problem of Algebraic Topology, in the problem of homotopy classification, particularly, in the obstruction theory for the section of a fibration. He has developed the complete form of the second obstruction problem. His high order obstruction functors seem to be a perspective tool for this important and extremely complicated problem.

His 90th birthday Professor Nodar Berikashvili meets full of energy and plans. We wish him further success in his scientific and pedagogical activity.

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