Revaz Bantsuri

Georgian science has suffered a grievous loss. Revaz Bantsuri, a prominent Georgian mathematician, corresponding member of the Georgian National Academy of Sciences, Doctor of physical and mathematical sciences, Professor, passed away.

He was born on June 10, 1936 in the village of Bantsurtkari (Dusheti region). Upon graduation from I. Javakhishvili Tbilisi State University, starting from 1960 up to the end of his life he worked at A. Razmadze Mathematical Institute holding different positions. In 1966 he defended his Candidate's thesis and in 1982 Doctoral thesis at the Institute of Problems of Mechanics of the Russian Academy of Sciences. From 1983 he headed the department of mathematical theory of elasticity.

In 1997, Revaz Bantsuri was elected a corresponding member of the Georgian National Academy of Sciences. He was a member of Russian National Committee in Theoretical and Applied Mechanics.

Revaz Bantsuri was Niko Muskhelishvili's pupil and worthy successor of his scientific ideas.

All his works he devoted to: boundary and contact problems of the plane theory of elasticity, mixed boundary value problems of the theory of analytic functions, problems of elasticity for domains with partially unknown boundaries, systems of convolution type integral equations and infinite algebraic equations. He essentially developed the well-known Muskhelishvili's research area, having appreciably enriched with new trends a range of application of methods of the theory of analytic functions.

Using integral transformations, R. Bantsuri reduced contact problems of certain classes to new type boundary value problems of the theory of analytic functions and called them the Carleman type problems for a strip.

He elaborated a new type method of factorization and solved the Carleman type problem in a rather general case. Applying this method, he solved very important contact problems of various types for isotropic and anisotropic bodies.

This method, besides the theory of elasticity, can be used in the theory of convolution type integral equations and in the theory of systems of the same type infinite algebraic equations, in problems of heat distribution with third kind boundary conditions, in problems of electromagnetic wave diffraction, etc. The method for the above-mentioned problems is of the same importance as that developed by Muskhelishvili in the 40th of the past century for investigation of classical contact problems. The method is known as R. Bantsuri's method of canonical solutions, and presently is a unique general method successfully used for effective solution of the above-mentioned contact problems.

The problems for domains with partially unknown boundaries deal with optimal distribution of stresses in a body. They belong to mathematically complicated and very important problems of optimal projecting. In a general case, these problems are reduced to nonlinear problems.

Revaz Bantsuri formulated the problems of the plane theory of elasticity and plate bending for some classes of problems with partially unknown boundaries and reduced them first to linear problems and then to the problems of the theory of analytic functions with shifts and called them the Carleman type problems for a circular ring. He elaborated the second method of factorization whose application allowed us to get a completed theory of solvability for that class of problems.

Applying the methods of Muskhelishvili and Wiener-Hopf, R. Bantsuri reduced statical problems of cracks, when the crack comes to the boundary or to the interface of a piecewise homogeneous medium, to the problem of linear conjugation with a Wiener class coefficient. He constructed effective solutions and studied the question on the stress concentration at the crack ends. Thus he has obtained significant results in fracture mechanics. The above-mentioned R. Bantsuri's result is recognized by specialists as one of the best results.

The problems of crack distribution in a body with constant or varying velocity belong to such a class of mixed problems when the points of change of boundary conditions displace in time. R. Bantsuri considered the problems when semi-infinite cracks in a plane spread linearly with constant or varying velocity. The problems of crack distribution with constant velocity were reduced by means of variable transformations to the problem of classical dynamics, while in the problem of crack distribution with varying velocity we get by means of Fourier-Laplace transformation the generalized Wiener-Hopf problem. An effective solution of that problem is obtained. The above method is used in contact problems when a semi-infinite rigid punch moves with varying velocity at the boundary of a half-plane or a

strip. Very interesting and significant results were obtained in this group of problems, as well.

The apparatus of the Cauchy type integral turned out to be insufficient for solving the Carleman type problems for a strip and a circular ring, hence Revaz Bantsuri constructed new integral representations which in this case have played the same role as the Cauchy type integrals in problems of linear conjugation. Using the obtained results, R. Bantsuri constructed for a circular ring a solution for the Riemann-Hilbert problem and for the mixed problem of the theory of analytic functions, he obtained effective solutions of a system of infinite convolution type algebraic equations.

R. Bantsuri together with G. Janashiya proved the invariance of Wiener functions algebra on the axis with respect to Hilbert transformations. This allowed him to reduce a solution of convolution type integral equations on the semi-axis for a summable kernel to the problem of linear conjugation in a class of Wiener functions.

Relying on the above-said, we can conclude that Revaz Bantsuri has made an internationally recognized contribution to the development of the theory of elasticity. He improved N. Muskhelishvili's method and largely extended an area of application of methods of the theory of analytic functions in the plane theory of elasticity.

A special mention should be made of Revaz Bantsuri's contribution to the cause of education of the young generation. For many years he worked at the Chair of Theoretical Mechanics of Tbilisi State University, delivered lectures in the theory of elasticity and brought up many candidates and doctors of sciences.

Revaz Bantsuri, a great researcher, remarkable citizen, excellent family man, modest and responsive, has passed away. He made a major contribution to the science, but there remained a lot of unrealizable thoughts and ideas. Editorial Board of our journal expresses sincerest condolences in connection with the death of a prominent scientist and dear colleague. His bright personality will leave the trace in our memory forever.

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