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Academician Boris Khvedelidze (November 7, 1915 – March 27, 1993)

This year we mark the 100-th birthday anniversary of the outstanding Georgian mathematician, distinguished scientist, Member of the Georgian National Academy of Sciences, Professor Boris Khvedelidze.

Boris Khvedelidze was born on 7 November 1915 in Chiatura (West Georgia). In 1918 his family resettled in Tbilisi. Father Vladimir Khvedelidze and mother Olgha Berishvili-Khvedelidze were doctors.

In 1931 Boris Khvedelidze graduated from the pedagogical technicum (formerly the 9-th labor school). During the school years Boris Khvedelidze was highly interested in history, philosophy and less in mathematics. After graduating from school he wanted to enroll in an engineering faculty, following the strong advice of his father. But, since he was not from working-class family, a necessary condition for this was a two years labor experience. Therefore he worked as a librarian in 1931–1933. Since members of working-class families had priority to be accepted for a course in engineering, Boris Khvedelidze enrolled in the Faculty of Physics and Mathematics (with specialization in mathematics) of the State University, hoping to change later to the engineering studies. During the first year at the university the professors Levan Gokieli and Archil Kharadze influenced him to give up the idea of becoming an engineer and he made his final choice towards mathematic. Later he decided to study intensively topics of complex analysis, differential and integral equations, inspired by the lectures of Ilya Vekua.

After graduating from the Tbilisi State University (TSU) in 1938 with honor, Boris Khvedelidze enrolled in a PhD course at the Mathematical Institute of the Georgian Branch of the Academy of Sciences of the Soviet Union (later Andrea Razmadze Mathematical Institute of the Georgian National Academy of Sciences). His mentor was the famous Georgian mathematician Ilya Vekua. He was lucky to witness the emergence of the famous seminars of Niko Muskhelishvili on Singular Integral Equations, where he participated very actively during many years. Boris Khvedelidze received his PhD degree in 1942 with a thesis entitled "The Poincare boundary value problem for a linear second order elliptic differential equation".

During the PhD studies, in 1938, Boris Khvedelidze started to teach mathematics at the Georgian Agricultural Institute as an assistant. From 1939 on he was teaching mathematics at the Tbilisi State University (TSU). After getting his PhD degree, Boris Khvedelidze was elected as a docent (associated professor) of TSU until 1951. In 1943-1944 he was Vice Dean of the Faculty of Physics and Mathematics of TSU.

From 1942 until 1953 he was working as a junior researcher and from 1943 as a senior researcher at the Mathematical Institute. In 1945–1948 he was the Scientific Secretary of the Institute.

On 26 December 1951, Boris Khvedelidze and his family (spouse and son) became victims of Stalin's repression. The family was deported to South Kazakhstan "for a rough violation of Soviet legality" (the reason behind was his uncles decision, after participation in the World War II, to stay in France and not to return to Soviet Union after the war!). All members of families of close relatives of "traitors" became subject to deportation from Georgia. Since Boris Khvedelidze was living with his mother in the apartment left by his father, they fall under this "human" rule of Stalinlaws.

From September 1952 until February 1954 Boris Khvedelidze was teaching mathematics in a zoo-veterinary professional school in a remote village of South Kazachstan. On December 9, 1953, the Supreme Court of Soviet Union in Moscow denounced the decision of deportation of the Khvedelidze family and they were allowed to repatriate. On February 22, 1954, Boris Khvedelidze returned to Tbilisi and was restored as a senior researcher at the Mathematical Institute.

In his hand-written autobiography Boris Khvedelidze recalls one episode of his deportation. The properties of all deported families were subject to obligatory confiscation. To prevent the worst B. Khvedelidze donated his father's rich library to the TSU (the rector at that time was Niko Ketskhoveli). Boris Khvedelidze was very thankfulto TSU and, in particular, to Niko Ketskhoveli that he got back his entire library after repatriation in 1954.

In 1956–1958 and from 1967 on until his last year Boris Khvedelidze was a professor of TSU. In 1958–1967 he hold one of three chairs in mathematics at the State Polytechnical Institute (now Technical University of Georgia).

In 1980–1993 Boris Khvedelidze held the Chair of Algebra and Geometry of Abkhazian State University (Sukhumi).

In 1957 Boris Khvedelidze defended his habilitation thesis "Linear discontinuous boundary value problems of function theory, singular integral equations and some of their applications", which was published in the same year in the journal "Trudy Tbilisskogo Matematicheskogo Instituta" (Proceedings of A. Razmadze Mathematical Institute), Vol. 23 (1956), pp. 3–158.

From 1954 until his last days Boris Khvedelidze worked at A. Razmadze Mathematical Institute first as a senior researcher and was elected in 1957 as Head of the Department of Function Theory and Functional Analysis.

The most important part of the scientific heritage of Boris Khvedelidze is, in our opinion, the theory of singular integral equations (SIEs) in Lebesgue spaces with exponential weight, where he obtained results similar to those in the theory of SIEs developed by Niko Muskhelishvili and his disciples in Hoelder classes with and without weight. This work, which was the core of his habilitation thesis in 1956, was one of the first, along with papers of S. Mikhlin, Israel Gohberg and Harold Widon, where methods of functional analysis were widely used in SIEs and its applications.The theorem on the boundedness of the Cauchy Singular Integral Operator in the Lebesgue spaces with exponential weight is until nowadays known as the "Khvedelidze Theorem".

In 1967 Boris Khvedelidze was elected a corresponding member of the Georgian Academy of Sciences and in 1983 he became a full member of the Academy. In the same year he got the distinction of "Honored Scientist".

From 1962 on, when the Georgian Mathematical Union was refunded, he became a vice-president of this institution for many years.

His disciples are Givi Khuskivadze (PhD in 1963), Vakhtang Paatashvili (PhD in 1964), Stefan Toklikishvili (PhD in 1968), Eteri Gordadze (PhD in 1969), Zoia Denisova (PhD in 1973), Elizaveta Ischenko (PhD in 1989).

I consider myself as a disciple of Boris Khvedelidze as well. He was my mentor during last years at the university, supervised my diploma work, send me to my PhD mentor Israel Gohberg to Chisineu and after my PhD in 1968 I worked in his department at A. Razmadze Mathematical Institute until he passed away in March 1993.

In conclusion it is proper to mention that the present short biography is based on the extended autobiography written by Boris Khvedelidze himself.

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List of Publications of B. Khvedelidze

(i) Monographs and Memoirs

1. Linear discontinuous boundary problems in the theory of functions, singular integral equations and some of their applications. (Russian) *Akad. Nauk Gruzin. SSR. Trudy Tbiliss. Mat. Inst. Razmadze* **23** (1956), 3–158.
2. The method of Cauchy type integrals in discontinuous boundary value problems of the theory of holomorphic functions of a complex variable. (Russian) *Current problems in mathematics, Vol. 7 (Russian)*, pp. 5–162 (errata insert). *Akad. Nauk SSSR Vsesojuz. Inst. Nauchn. i Tehn. Informacii, Moscow*, 1975.

(ii) Papers

3. On the Poincare boundary value problem of the logarithmic potential theory. (Russian) *Dokl. Akad. Nauk SSSR* **30** (1941), No. 3.
4. On the Poincare boundary value problem of the logarithmic potential theory for multi-connected domains. (Russian) *Soobshch. Akad. Nauk Gzuz. SSR* **2** (1941), No. 7, 571–578.
5. On the Poincare boundary value problem of the logarithmic potential theory. Second announcement. (Russian) *Soobshch. Akad. Nauk Gzuz. SSR* **2** (1941), No. 10.
6. Solution of one boundary value problem of the Newton potential theory by the method of Acad. N. I. Muskhelishvili. (Russian) *Trudy Tbiliss. Gos. Univ.* **23** (1942), 65–177.
7. On one Riemann linear boundary value problem for a system of analytic functions. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **4** (1943), No. 4, 289–296.
8. Poincare problem for the second order linear differential equation of elliptic type. (Russian) *Trudy Tbiliss. Gos. Univ.* **12** (1943).
9. Some properties of improper integrals in the sense of the Cauchy–Lebesgue principal value. (Russian) *Soobshcheniya Akad. Nauk Gruzin. SSR* **8** (1947), 283–290.
10. Singular integral equations in improper Cauchy–Lebesgue integrals. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **8** (1947), No. 7, 424–434.
11. On an inversion formula (with I. N. Kartsivadze). (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **10** (1949), 587–591.
12. On Riemann's problem in the theory of analytic functions and singular integral equations with kernels of Cauchy type. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **12** (1951), 69–76.
13. On the problem of linear conjunction in the theory of analytic functions. (Russian) *Dokl. Akad. Nauk SSSR (N.S.)* **76** (1951), 177–180.
14. On linear singular integral equations with a singular kernel of Cauchy type. (Russian) *Dokl. Akad. Nauk SSSR(N.S.)* **76** (1951), 367–370.
15. On an integral of Cauchy type (with I. N. Kartsivadze). (Georgian) *Akad. Nauk Gruzin. SSR. Trudy Tbiliss. Mat. Inst. Razmadze* **20** (1954), 211–244.
16. On a class of singular integral equations with kernels of Cauchy type. (Russian) *Soobshch. Akad. nauk Gruz. SSR* **15** (1954), 401–405.
17. Some composition formulas for singular integrals and their applications to the inversion of a Cauchy-type integral. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **16** (1956), 81–88.
18. On the Riemann–Privalov problem in the theory of analytic functions. (Russian) *Uspekhi Mat. Nauk (N.S.)* **10** (1955), no. 3(65), 165–171.
19. On a discontinuous problem of Riemann–Privalov in the theory of analytic functions. (Russian) *Dokl. Akad. Nauk SSSR (N.S.)* **102** (1955), 1081–1084.
20. On the discontinuous boundary problem of Riemann–Privalov with coefficients having critical pointss. (Russian) *Dokl. Akad. Nauk SSSR (N.S.)* **111** (1956), 40–43.

21. Singular integral equations with Cauchy kernels in the class of functions that possess weighted sums. (Russian) *Dokl. Akad. Nauk SSSR (N.S.)* **111** (1956), 304–307.
22. On the discontinuous problem of Riemann–Privalov for several unknown functions. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **17** (1956), 865–872.
23. On singular integral equations with Cauchy type kernels in a class of summable with weight functions. (Russian) *Trudy 3-go Vsesojuzn. S'ezda* **I** (1956).
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25. A remark on my work "Linear discontinuous boundary problems in the theory of functions, singular integral equations and some of their applications". (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **21** (1958), 129–130.
26. On the Riemann–Privalov problem with continous coefficients (with G. F. Manjavidze). (Russian) *Dokl. Akad. Nauk SSSR* 123(1958), 791–796 .
27. The discontinuous Riemann–Privalov problem with given displacement. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **21** (1958), 3850–389.
28. Regularization problem in the theory of integral equations with Cauchy kernel. (Russian) *Dokl. Akad. Nauk SSSR* **140** (1961), 66–68.
29. Some notes to the theory of singular equations with a Cauchy type kernel (with D. F. Kharazov). (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **28** (1962), 129–135.
30. The Riemann–Privalov boundary-value problem with a piecewise continuous coefficient. (Russian) *Gruzin. Politehn. Inst. Trudy* **1962** (1962), No. 1 (81), 11–29.
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33. A certain singular integral operator (with E. G. Gordadze). (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **71** (1973), No. 1, 33–36.
34. A Cauchyjevih integralih in o robnih nalogah linearnega kanjugiranja. (Yugoslavia) *Obzornik za Math. in fiz., Ljubljana* **20** (1973), No. 5.
35. Singular integral operators, and the regularization problem (with E. G. Gordadze). (Russian) Collection of articles on the theory of functions, Vol. 7. *Sakharth. SSR Mecn. Akad. Math. Inst. Šrom.* **53** (1976), 15–37.
36. On singular integral operators (with E. G. Gordadze). *Function theoretic methods in differential equations*, pp. 132–157. Res. Notes in Math., No. 8, *Pitman, London*, 1976.
37. The problem of linear conjugacy and of characteristic singular integral equations. (Russian) *Complex analysis and its applications (Russian)*, pp. 577–585, 671, *"Nauka", Moscow*, 1978.
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43. Boundary properties and boundary value problems (with A. G. Jvarsheishvili). *History of our mathematics* **4** (1970), Book I, 211–253.
44. One-dimensional singular integral equations (with G. F. Manjavidze). *History of our mathematics* **4** (1970), Book I, 774–785.
45. Some classes of integral equations (with G. F. Manjavidze). *History of our mathematics* **4** (1970), Book I, 797–799.
46. David Fomich Kharazov (with G. Ja. Areshkin, V. P. Il'in, B. V.; Chogoshvili, G. S. David Fomich Harazov). *Uspekhi Mat. Nauk* **30** (1975), No. 6(186), 153–157 (1 plate).
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53. A survey on I. N. Muskhelishvili's scientific heritage (with G. F. Manjavidze). *Acad. Sciences of Georgian Republic, A. Razmadze Math. Inst., Tbilisi*, 1991, 1–45.

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58. Integral equation of convolution type. Vol. II, 1979.
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61. Nekrasova Integral equation. Vol. III, 1982.
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