

List of Main Publications of Sergo Kharibegashvili

(i) monographs

1. Goursat and Darboux type problems for linear hyperbolic partial differential equations and systems. *Mem. Differential Equations Math. Phys.* **4**(1995), 1-127.
2. Some multidimensional problems for hyperbolic partial differential equations and systems. *Mem. Differential Equations Math. Phys.* **37** (2006), 1-136.
3. Boundary value problems for some classes of nonlinear wave equations. *Mem. Differential Equations Math. Phys.* **46** (2009), 1-114.

(ii) papers

1. The characteristic problem for hyperbolic second order systems with constant coefficients. (Russian) *Differentsial'nye Uravneniya* **14**(1978), No. 1, 123-135; English transl.: *Differ. Equations* **14**(1978), No. 1, 87-96.
2. The characteristic problem for second order strictly hyperbolic systems with two independent variables. (Russian) *Differentsial'nye Uravneniya* **15**(1979), No. 1, 142-152; English transl.: *Differ. Equations* **15**(1979), No. 1, 99-106.
3. A characteristic problem for linear nonstrictly hyperbolic systems. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **93** (1979), No. 3, 553-556.
4. A problem of Goursat type for a certain class of hyperbolic systems. (Russian) *Differentsial'nye Uravneniya* **17**(1981), No. 1, 157-164; English transl.: *Differ. Equations* **17**(1981), No. 1, 110-115.
5. Goursat problem for a class of systems of second order hyperbolic equations. (Russian) *Differentsial'nye Uravneniya* **18**(1982), No. 1, 152-166; English transl.: *Differ. Equations* **18**(1982), No. 1, 131-142.
6. Solvability of a Goursat problem for second order normally hyperbolic systems with variable coefficients. (Russian) *Differentsial'nye Uravneniya* **19**(1983), No. 1, 137-145; English transl.: *Differ. Equations* **19**(1983), No. 1, 114-123.
7. On some boundary value problem for normally hyperbolic systems of second order. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **116**(1984), No. 2, 269-272.
8. About the solvability of some boundary value problem for linear normally hyperbolic second order systems with variable coefficients. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **116**(1984), No. 3, 477-480.
9. On some higher dimensional problem of Goursat type for strictly hyperbolic systems of second order. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **117**(1985), No. 1, 37-40.
10. Characteristic problem for a class of second order hyperbolic systems with parabolic degeneration. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **117**(1985), No. 2, 261-263.
11. On the solvability of a class of degenerate functional equations. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **117**(1985), No. 3, 497-499.
12. On a boundary value problem for a second order hyperbolic equation. (Russian) *Dokl. Akad. Nauk SSSR* **280**(1985), No. 6, 1313-1316; English transl.: *Sov. Math., Dokl.* **31**(1985), 250-252.
13. A boundary value problem for second order normally hyperbolic systems with variable coefficients. (Russian) *Differentsial'nye Uravneniya* **21**(1985), No. 1, 149-155; English transl.: *Differ. Equations* **21**(1985), No. 1, 121-126.
14. A characteristic problem for a class of second order hyperbolic systems with a parabolic degeneration. (Russian) *Differentsial'nye Uravneniya* **22**(1986), No. 1, 153-164; English transl.: *Differ. Equations* **22**(1986), No. 1, 122-131.

15. Solvability of a boundary value problem for second order hyperbolic equations. (Russian) *Trudy Inst. Prikl. Mat. Im. I. N. Vekua* **19**(1987), 122-173.
16. Solvability of a characteristic problem for degenerate second order hyperbolic systems. (Russian) *Differentsial'nye Uravneniya* **25**(1989), No. 1, 154-162; English transl.: *Differ. Equations* **25**(1989), No.1, 123-131.
17. The characteristic problem for a class of second order hyperbolic systems with degeneration of the type and order. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **135**(1989), No. 2, 269-271.
18. On the solvability of a characteristic problem for second order degenerate hyperbolic systems. (Russian) *Rep. Enlarged Sess. Semin. I. Vekua Inst. Appl. Math.* **4** (1989), No. 1, 116-119.
19. Characteristic problem for a class of second order hyperbolic systems with type-changes on characteristics. (Russian) *Differentsial'nye Uravneniya* **26**(1990), No. 2, 305-313; English transl.: *Differ. Equations* **26**(1990), No. 2, 235-242.
20. On a characteristic problem for second order hyperbolic systems with degeneration of type and order. (Russian) *Soobshch. Akad. Nauk Gruz. SSR* **140**(1990), No. 1, 29-31.
21. On the solvability of a characteristic problem for second order normal hyperbolic systems with degeneration of type and order. (Russian) *Rep. Enlarged Sess. Semin. I. Vekua Inst. Appl. Math.* **6** (1991), No. 1, 77-80.
22. On a spatial problem for high order strictly hyperbolic systems in several independent variables. (Russian) *Bull. Georgian Acad. Sci.* **146**(1992), No. 1, 478-481.
23. On a characteristic problem for the wave equation. *Tbiliss. Gos. Univ. Inst. Prikl. Mat. Trudy* **47** (1992), 76-82.
24. On the correct formulation of one multidimensional problem for strictly hyperbolic equations of higher order. *Proc. Georgian Acad. Sci., Math.* **1**(1993), No. 2, 159-169.
25. On a problem of Darboux type for second order hyperbolic equation. (Russian) *Rep. Enlarged Sess. Semin. I. Vekua Inst. Appl. Math.* **8** (1993), No. 1, 41-42.
26. On the correct formulation of a multidimensional problem for strictly hyperbolic equations of higher order. *Georgian Math. J.* **1**(1994), No. 2, 141-150.
27. On a spatial problem of Darboux type for a second order hyperbolic equation. *Georgian Math. J.* **2**(1995), No. 3, 299-311.
28. On the solvability of a spatial problem of Darboux type for the wave equation. *Georgian Math. J.* **2**(1995), No. 4, 385-394.
29. On a non-characteristic multidimensional problem of Darboux type for the wave equation. (Russian) *Rep. Enlarged Sess. Semin. I. Vekua Inst. Appl. Math.* **10** (1995), No. 1, 43-45.
30. On the solvability of a Darboux type non-characteristic spatial problem for the wave equation. *Georgian Math. J.* **3**(1996), No. 1, 59-68.
31. On a Darboux type multidimensional problem for second order hyperbolic systems. *Georgian Math. J.* **3**(1996), No. 4, 363-378.
32. On the solvability of the multidimensional version of the first Darboux problem for a model second-order degenerating hyperbolic equation. *Georgian Math. J.* **4**(1997), No. 4, 341-354.
33. On the solvability of a multidimensional version of the Goursat problem for a second order hyperbolic equation with characteristic degeneration. *Mem. Differential Equations Math. Phys.* **11**(1997), 89-103.
34. To the theory of boundary value problems for hyperbolic type equations and systems (with J. Gvazava). *Mem. Differential Equations Math. Phys.* **12**(1997), 68-75.
35. On some multidimensional versions of a characteristic problem for second order degenerating hyperbolic equations. *Georgian Math. J.* **5**(1998), No. 2, 139-156.
36. On some boundary value problems for an ultrahyperbolic equation. *Georgian Math. J.* **5**(1998), No. 4, 341-360.

37. Boundary value problems for a class of systems of second order partial differential equations. (Russian) *Differentsial'nye Uravneniya* **34**(1998), No. 1, 114-122; English transl.: *Differ. Equations* **34**(1998), No. 1, 117-125.
38. On the solvability of some multidimensional versions of the Goursat problem for a first order hyperbolic system. (Russian) *Differentsial'nye Uravneniya* **35**(1999), No. 8, 1112-1121.
39. On the formulation of characteristic problems for first order symmetric hyperbolic systems. (Russian) *Differentsial'nye Uravneniya* **36**(2000), No. 8, 1113-1122.
40. Direct and inverse fluid-structure interaction problems (with D. Natroshvili and Z. Tediashvili). *Rend. Mat. Appl. (7)* **20**(2000), 57-92.
41. On a vibration of elastic cusped burs (with G. Jaiani). *Bull. TICMI* **4**(2000), 24-28.
42. A multidimensional version of the first Darboux problem for a second order degenerating hyperbolic equation. *Appl. Math. Inform.* **5** (2000), No. 1, 66-76.
43. Some mathematical problems related to the first approximation of I. Vekua's theory for cusped prismatic shells (with G. Devdariani, G. Jaiani, D. Natroshvili). *Appl. Math. Inform.* **5**(2000), No. 2, 26-46.
44. Dynamical problems in the (0,0) and (1,0) approximations of a mathematical model of cusped bars (with G. Jaiani). *Functional-analytic and Complex Methods, Interactions, and Applications to Partial Differential Equations. Proceedings of the International Graz Workshop (Graz, Austria, 12-16, February)*, 188-247, World Scientific, 2001.
45. On the solvability of some boundary value problems for symmetric first order hyperbolic systems in a dihedral angle. *Mem. Differential Equations Math. Phys.* **27**(2002), 115-144.
46. On the correct formulation of some nonlocal problems for the wave equations. (Russian) *Differentsial'nye Uravneniya* **39**(2003), No. 4, 539-553.
47. On the correct formulation of some boundary value problems for symmetric hyperbolic systems of first order in a dihedral angle. *Mem. Differential Equations Math. Phys.* **29**(2003), 1-30.
48. Hierarchical models for elastic cusped plates and beams (with G. Jaiani, D. Natroshvili, and W. L. Wendland). *Lect. Notes TICMI* **4** (2003), 1-121.
49. A multidimensional version of the Darboux problem for a model degenerating second order hyperbolic equation. (Russian) *Differentsial'nye Uravneniya* **40** (2004), No. 4, 565-573; English transl.: *Differential Equations* **40** (2004), No. 4, 610-619.
50. On some nonlocal problems for a hyperbolic equation of second order on a plane (with G. Bogveradze). *Proc. A. Razmadze Math. Inst.* **136** (2004), 1-36.
51. Two-dimensional hierarchical models for prismatic shells with thickness vanishing at the boundary (with G. Jaiani, D. Natroshvili and W. L. Wendland). *Journal of Elasticity* **77** (2004), No. 2, 95-122.
52. On some boundary value problems for a class of hyperbolic systems of second order in a conic domains. *I. Inequal. Appl.* **2005**, No. 5, 547-567.
53. On the existence or the absence of global solutions of the Cauchy characteristic problem for some nonlinear hyperbolic equations. *J. Boundary Value Problems* **2005**, No. 3, 359-376.
54. Some traits of the creative portrait of Andro Bitsadze (with J. Gvazava and O. Jokhadze). *Proceedings of I. Javakhishvili Tbilisi State University* **354** (2005), 128-143.
55. On the nonexistence of global solutions of the characteristic Cauchy problem for a nonlinear wave equation on a conical domain. (Russian) *Differentsial'nye Uravneniya* **42** (2006), No. 2, 261-271; English transl.: *Differential Equations* **42** (2006), No. 2, 279-290.
56. On some problems with integral restrictions for hyperbolic second order equations and systems on a plane (with G. Bogveradze). *Proc. A. Razmadze Math. Inst.* **140** (2006), 17-48.

57. On the global and local solution of the multidimensional Darboux problem for some nonlinear wave equations (with G. Bogveradze). *Georgian Math. J.* **14** (2007), No. 1, 65-80.
58. On the existence or absence of global solutions for the multidimensional version of the second Darboux problem for some nonlinear hyperbolic equations. (English) *Differential Equations* **43** (2007), No. 3, 402-416. Translated from *Differentsial'nye Uravneniya*, **43** (2007), No. 3, 388-401.
59. On the global solvability of the Cauchy characteristic problem for one nonlinear wave equation in a light cone of the future. *Mem. Differential Equations Math. Phys.* **42** (2007), 49-68.
60. On the existence and nonexistence of global solutions of the characteristic Cauchy and Darboux problems for the multidimensional nonlinear wave equations. (Russian) *AMIM* **12** (2007), No. 1, 80-86.
61. On the solvability of one multidimensional version of the first Darboux problem for some nonlinear wave equations. *J. Nonlinear Analysis: Theory, Methods & Applications* **68** (2008), 912-924.
62. On the Solvability of the Cauchy characteristic problem for a nonlinear equation with iterated wave operator in the principal part. *J. Math. Anal. Appl.* **338** (2008), 71-84.
63. On the solvability of the Cauchy characteristic problem for some nonlinear wave equations in a light cone of the future. *Differential Equations* **44**(2008), No.1, 135-146. Translated from *Differentsial'nye Uravneniya* **44** (2008), No.1, 129-139.
64. On existence and absence of global solutions of the first Darboux problem for nonlinear wave equations (with G. K. Berikelashvili, O. Jokhadze and B. G. Midodashvili). *Differential Equations*, **44**(2008), No. 3, 1-16. Translated from *Differentsial'nye Uravnenia* **44**(2008), No. 3, 359-372.
65. First Darboux problem for nonlinear hyperbolic equations of second order (with O.M. Dzhokhadze) (Russian). *Mat. Zametki* **84** (2008), No.5, 693-712.
66. Solvability of characteristic boundary-value problems for nonlinear equations with iterated wave operator in the principal part (with B. Midodashvili). *Electron. J. Differential Equations* **2008**, No. 72, 1-12.
67. On one boundary value problem for a nonlinear equation with iterated wave operator in the principal part (with B. Midodashvili). *Georgian Math. J.* **15** (2008), No. 3, 541-554.
68. Existence and uniqueness theorems for cusped prismatic shells in the N-th hierarchical model (with N. Chinchaladze, R. Gilbert, G. Jaiani, D. Natroshvili). *Math. Methods Appl. Sci.* **31** (2008), No.11, 1345-1367.
69. On some three-dimensional variants of Goursat and Darboux problems for higher-order hyperbolic equations with dominating principal parts (with B. Midodashvili). *J. Math. Sci. (New York)* **157** (2009), No. 1, 119-139.
70. Finite-difference method of solving the Darboux problem for nonlinear Klein-Gordon equation (with G. Berikelashvili, O. Jokhadze, B. Midodashvili). *Mem. Differential Equations Math. Phys.* **47** (2009), 123-132.
71. Finite difference scheme for one mixed problem with integral condition (with G. Berikelashvili and D. Gordeziani). Proceedings of the 2nd WSEAS Int. Conf. on "Finite Differences, Finite Elements, Finite Volumes, Boundary Elements" (F-and-B'09), 118-120, 2009.
72. Some properties of Riemann and Green-Adamard functions for second order linear hyperbolic equations (with O.M. Jokhadze). *Differentsial'nye Uravnenia* (accepted).
73. Dynamical solid-fluid interaction problem (with N. Chinchaladze, R. Gilbert, G. Jaiani, D. Natroshvili). *Proc. I. Velua Inst. Appl. Math. Tbilisi State Univ.* (accepted).
74. A cusped elastic beam under the action of stresses and concentrated forces (with N. Chinchaladze, R. Gilbert, G. Jaiani, D. Natroshvili). *Appl. Anal.* (submitted).

75. Finite difference solution of a nonlinear Klein-Gordon equation with an external source. (with G. Berikelashvili, O. Jokhadze, B. Midodashvili). *Mathematics of Computation* (submitted).
76. The Cauchy-Goursat problem for the wave equations with dissipative term (with O.M. Jokhadze) (Russian). *Mat. Zametki* (submitted).
77. The Darboux first problem for wave equations with nonlinear dissipative term (with O.M. Jokhadze). *Math. Nachr.* (submitted).
78. Solvability of Cauchy spatial characteristic problem for one class of second order nonlinear wave equations (with B. Midodashvili). *Electron. J. Differential Equations* (submitted).
79. Some nonlocal problems for second order strictly hyperbolic systems on a plane (with B. Midodashvili). *Georgian Math. J.* (submitted).
80. on one boundary value problem for nonlinear wave equations in a conic domain of time type (with B. Midodashvili). *Nonlinearity* (submitted).

Participation in international scientific forums:

1981

Problems of Goursat type for a class of hyperbolic systems. Conference in Equations of Mixed Type. Nalchik, Russia, May, 1981.

1986

On a characteristic problem for a class of second order hyperbolic systems with parabolic degeneration. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics. Tbilisi, Georgia, April, 1986.

On a characteristic problem for a class of second order hyperbolic systems with parabolic degeneration. Conference in Nonlocal Problems for Partial Differential Equations. Nalchik, Russia, May, 1986.

1987

On a characteristic problem for second order degenerate hyperbolic systems. All-union Symposium in Modern Problems of Mathematical Physics. Tbilisi, Georgia, April, 1987.

1988

On the solvability of a characteristic problem for second order hyperbolic systems with the characteristic line of degeneracy. All-union School of Young Researchers "Functional Methods in Applied Mathematics and Mathematical Physics". Tashkent, Uzbekistan, May, 1988.

1989

On the solvability of a characteristic problem for second order degenerate hyperbolic systems. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics. Tbilisi, Georgia, April, 1989.

On a characteristic problem for second order hyperbolic systems with characteristic degeneration. Fourth Conference on Differential Equations and Applications. Rousse, Bulgaria, August, 1989.

1991

On the solvability of a characteristic problem for second order normal hyperbolic systems with degenerations of type and order. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics. Tbilisi, Georgia, April, 1991.

On a characteristic problem for the wave equation. Scientific conference "Boundary Value Problems and their Spectral Analysis for Differential Equations. Alma-Ata, Kazakhstan, May, 1991.

On a multidimensional problem for strictly hyperbolic equations of higher order. International Symposium in Continuum Mechanics and Related Problems of Analysis, dedicated to Academician N. Muskhelishvili's Centenary. Tbilisi, Georgia, June, 1991.

1993

On a problem of Darboux type for second order hyperbolic equation. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics. Tbilisi, Georgia, April, 1993.

On the correct formulation of one multidimensional problem for strictly hyperbolic equations of higher order in the conic domain. 10th Conference on Problems and Methods in Mathematical Physics. Chemnitz, Germany, September, 1993.

1994

Darboux type multidimensional problems for second order hyperbolic equations. 25th Annual Iranian Mathematics Conference. Tehran, Iran, March, 1994.

On a spatial problem of Darboux type for a second order hyperbolic equations. The First Congress of Georgian Mathematicians. Tbilisi, Georgia, June, 1994.

On the solvability of multidimensional problems of Goursat type for higher order hyperbolic equations. International Congress of Mathematician. Zurich, Switzerland, August, 1994.

1995

On a non-characteristic multidimensional problem of Darboux type for the wave equation. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics. Tbilisi, Georgia, April, 1995.

1997

On the solvability of a Carbox type multidimensional problem for second order hyperbolic systems. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics. Tbilisi, Georgia, April, 1997.

Some multidimensional versions of a characteristic problem for the first order hyperbolic system. The International Symposium on Problems of Continuum Mechanics dedicated to Prof. A. Gorgidze's Ninetieth birthday Anniversary. Tbilisi, Georgia, June, 1997.

On the solvability of a characteristic problem for the Maxwell system of differential equations. The International Symposium dedicated to the 90th Birthday Anniversary of Academician I. Vekua. Tbilisi, Georgia, June, 1997.

To the theory of boundary value problems for equations and systems of hyperbolic type. The International Symposium dedicated to the 90th Birthday Anniversary of Academician I. Vekua. Tbilisi, Georgia, June, 1997.

On a multidimensional versions of the Darboux problem for a second order degenerated hyperbolic equations. The Second Congress of Georgian Mathematicians. Tbilisi, Georgia, September, 1997.

2001

The characteristic problem for the first order hyperbolic systems in conic domains. Symposium in Differential Equations and Mathematical Physics. Tbilisi, Georgia, July, 2001.

Boundary value problems for the one class of the second order systems of partial differential equations. The III Congress of Georgian Mathematicians. Tbilisi, Georgia, October, 2001.

2003

On the solvability of some boundary value problems for a class of first order hyperbolic systems. The Second International Conference "Functional spaces. Differential operators. Problems of mathematical education". Moscow, Russia, March 24-26, 2003.

Some boundary value problems for a class of first order hyperbolic systems. International Conference "Potential Theory: Applications in Solid Mechanics and Acoustic and Electromagnetic Scattering Theory". Tbilisi, Georgia, October 26-30, 2003.

On some nonlocal problems for a wave equation. Symposium on Differential Equations and Mathematical Physics dedicated to the 100th Birthday Anniversary of Academician V. Kupradze and 90th Birthday Anniversary of Academician N. Vekua. Tbilisi, Georgia, December 24-25, 2003.

2005

Nonexistence of the global solutions of the Cauchy characteristic problem for some wave equations with power nonlinearity. International School in Physics and Mathematics "Function spaces, Integral Transforms and Applications in PDE". Tbilisi, Georgia, August 31-September 5, 2005 .

Some Boundary and initial boundary problems for a second order hyperbolic equations with different degenerations. Tbilisi International Centre of Mathematics and Informatics "Degenerate Partial Differential equations, Weighted Spaces, and Applications to Mechanics." Tbilisi, Georgia, September, 14-16, 2005 .

On the well-posed question of boundary value problems for one class of the second order hyperbolic systems in conic domains. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics. Tbilisi, Georgia, April, 2005 .

2006

On the existence or the absence of global solutions of the Cauchy characteristic problem for some nonlinear hyperbolic equations. The International Conference Tikhonov and Contemporary Mathematics. Moscow, Russia, June 19-25, 2006 .

2007

On the existence and nonexistence of global solutions of the characteristic Cauchy and Darboux problems for the multidimensional nonlinear wave equations. ISAAC Conference on Complex Analysis, Partial Differential Equations, and Mechanics of Continua. Tbilisi, Georgia, April 23-27 . 2007

2008

Finite difference solution of a nonlinear Klein-Gordon equation with an external source (with G. Berikelashvili, J. Gvazava, O. Jokhadze, B. Midodashvili). NAA'08: Fourth International Conference on Numerical Analysis and Applications. Lozenetz, Bulgaria, June 16-20. 2008

Difference method of solving the Darboux problem for nonlinear Klein-Gordon equation (with G. Berikelashvili, O. Jokhadze). International Conference on "Modern Problems in Applied Mathematics", Dedicated to the 90-th anniversary of Iv. Javakhishvili Tbilisi State University (TSU) and 40th Anniversary of the Foundation of I.Vekua Institute of Applied Mathematics. Tbilisi, Georgia, 26-28 September, 7-9 October. 2008

On the characteristic boundary value problems for nonlinear equations with iterated wave operator in the principal part. International Conference on "Modern Problems in Applied Mathematics", Dedicated to the 90-th anniversary of Iv. Javakhishvili Tbilisi State University (TSU) and 40th Anniversary of the Foundation of I.Vekua Institute of Applied Mathematics. Tbilisi, Georgia, 26-28 September, 7-9 October. 2008

A boundary value problem for wave equations. XXII Enlarged Session of the Seminar at I. Vekua Institute of Applied Mathematics. Tbilisi, Georgia, April 22-25.2008 .

Finite Difference scheme for Klein-Gordon equation with cubic nonlinearity (with G. Berikelashvili, O. Jokhadze, B. Midodashvili). XXII Enlarged Session of the Seminar at I. Vekua Institute of Applied Mathematics. Tbilisi, Georgia, April 22-25. 2008

Some boundary value problems for nonlinear hyperbolic equations. A. Razmadze Institute of Mathematics. Scientific Session. Tbilisi, Georgia, October 20-24. 2008

2009

Finite difference scheme for one mixed problem with integral condition (with G. Berikelashvili and D. Gordeziani). 2nd WSEAS International Conference on Finite Differences – Finite Elements – Boundary Elements (F – and – B'09). Tbilisi, Georgia, June 26-28. 2009

The Cauchy characteristic problem for one class of nonlinear wave equations in a light cone of the future (with B. Midodashvili) XXIII Enlarged Session of the Seminar at I. Vekua Institute of Applied Mathematics. Tbilisi, Georgia, April 22-24. 2009

A boundary value problem for second order nonlinear hyperbolic equations in the angular domain. (with O. Jokhadze). XXIII Enlarged Session of the Seminar at I. Vekua Institute of Applied Mathematics. Tbilisi, Georgia, April 22-24. 2009