



CURRICULUM VITAE

NAME

Roman Koplataдзе

PERMANENT ADDRESS:

Tsotne Dadiani ave., 2nd Microregion, 2nd building, flat 184
Tbilisi 380080
Georgia

AFFILIATION:

Department of Mathematics of Tbilisi State University
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PERSONAL DATA:

Date of Birth: 01.01.1942
Place of Birth: Village of Basileti, Georgia
Nationality: Georgian
Marital Status: Married

PRESENT POSITION:

2006 - Department of Mathematics of Tbilisi State University, Professor

EDUCATION AND SCIENTIFIC DEGREE:

1961-
1967 Student of Tbilisi State University, faculty of Mechanics and Mathematics
1967- Diploma in Mathematics (with honors), Tbilisi State University
1967-
1969 Post-graduate student of Tbilisi State University

DEGREE:

Candidate of Sciences (Ph.D):1974 - Tbilisi State University

Doctor of Sciences: 1995 -A. Razmadze Mathematical Institute of Georgian Academy of Sciences

LANGUAGES:

Georgian

Russian

English (satisfactory)

POSITIONS HELD AND ACADEMIC EXPERIENCE:

1970 - 1976	Junior Researcher of the Department of Ordinary Differential equations of I. Vekua Institute of Applied Mathematics of Tbilisi State University
1976 - 1983	Senior Researcher of the same department
1983 - 1990	Leading Researcher of the same department
1991 - 1995	Head of the same department
1996 - 2006	Leading Researcher of A. Razmadze Mathematical Institute of Georgian Academy of Sciences, Professor
2006 -	Department of Mathematics of Tbilisi State University, Professor

TEACHING:

1980 -	Special Courses ordinary differential equations, Faculty of Mechanics and Mathematics of Tbilisi State University
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RESEARCH INTERESTS:

Ordinary differential equations (Qualitative theory of nonautonomous differential equations, Oscillation theory, Boundary value problems)

PRIZES AND AWARDS:

1996	I. Vekua prize of the Georgian Academy of sciences
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FELLOWSHIPS AND GRANTS:

NATO Research Fellowship - University of Ioannina, November 1997-December 1998

Research Grant of the Greek Ministry of Development in the framework of Bilateral S&T Cooperation between the Hellenic Republic and the Republic of Georgia – University of Ioannina, Department of Mathematics, Ioannina, Greece, February-April, 2001

Research Grants of the Georgian Academy of Sciences – # 1.6.97 (1997-1999); # 1.6.00 (2000-2001); # 1.6.02 (2002-2003); # 1.6.04 (2004-2005)

SUPERVISION OF POST-GRADUATE STUDENTS:

G. Giorgadze - defended the Ph. D. in 1998 at Tbilisi State University

N. Partsvania - defended the Ph. D. in 1999 at A. Razmadze Mathematical Institute

PARTICIPATION IN CONFERENCES AND OTHER SCIENTIFIC FORUMS:

1. Fourth All-Union Conference on the Qualitative Theory of Differential Equations (Ryazan, Russia, 1976) - speaker.
2. Joint Sessions of the Petrovski Seminar and of the Moscow Mathematical Society (Moscow, Russia, 1986) - speaker.
3. All-Union Symposium on Current Problems of Mathematical Physics dedicated to the 80th anniversary of Academician I. Vekua (Tbilisi, Georgia, 1987) - speaker.
4. Seventh All-Union Conference on the Qualitative Theory of Differential Equations (Riga, Latvia, 1989) - speaker.
5. Equadiff 8 - Czechoslovak Conference on Differential Equations and Their Applications (Bratislava, Slovakia, 1993) - speaker.
6. First Congress of Mathematicians of Georgia (Tbilisi, Georgia, 1993) - speaker.
7. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics (Tbilisi, Georgia, 1996) – speaker.
8. DEMPh-97 - International Symposium on Differential Equations and Mathematical Physics dedicated to the 90th birthday anniversary of Academician I. Vekua (Tbilisi, Georgia, 1997) - speaker.
9. Equadiff 9 - Czechoslovak Conference on Differential Equations and Their Applications (Brno, Czech Republic, 1997) - invited lecturer.
10. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics (Tbilisi, Georgia, 1998) – speaker.
11. FDE 1 - The 1-st International Conference on Functional Differential Equations (Kedumim-Ariel, Israel, 1998) - speaker.
12. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics (Tbilisi, Georgia, 2000) – speaker.
13. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics (Tbilisi, Georgia, 2002) – speaker.
14. International Symposium in Differential Equations and Mathematical Physics (Tbilisi, Georgia, 2003) – speaker.
15. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics (Tbilisi, Georgia, 2004) speaker.
16. Fourth International Conference on Differential and Functional Differential Equations (Moscow, 2005) – speaker.
17. International Workshop “Function Spaces, Integral Transforms and Their Applications” (Tbilisi, 2005) – speaker.
18. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics (Tbilisi, Georgia, 2006) – speaker.
19. Third International Conference of Applied Mathematics (Plovdiv, Bulgaria, 2006) – speaker.
20. Symposium on Functional Differential Equations (Judea and Samaria, Israel, 2006) - invite-lecture.

21. Symposium on “Contemporary Mathematics and its Application” in honor of Professor Revaz Gamkrelidze (Batumi State University, Batumi, Georgia 2007) - invite-lecture.
22. Forth International Conference of Applied Mathematics and Computing (Plovdiv, Bulgaria, 2007) - invite-lecture.
23. Sixth International ISAAC Congress (Middle East Technical University, Ankara, 2007) - invite-lecture.
24. ISAAC Conference on Complex Analysis, Partial Differential Equations, and Mechanics of Continua Dedicated to the Centenary of Ilia Vekua, (Tbilisi, Georgia 2007) - speaker.
25. Workshop Variable Exponent Analysis and Belated Topics (Tbilisi, Georgia, 2008) - speaker.
26. The Fifth World Congress of Nonlinear Analysts (WCNA-2008 Orlando, Florida, USA, 2008) – invite-lecture.
27. Symposium on Functional Differential Equations (Ariel, Israel, 2008) - invite-lecture.
28. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics (Tbilisi, Georgia, 2008) - speaker.
29. ISAAC Conference on Complex Analysis, Partial Differential Equations, and Mechanics of Continua. Dedicated to Centenary of I. Vekua. (Tbilisi, Georgia, 2008) – speaker.
30. International Conference on Modern Problems in Applied Mathematics. Dedicated to the 90-th anniversary of Iv. Javakhishvili Tbilisi State University (TSU) and 40-th anniversary of I. Vekua Institute of Applied Mathematics (VIAM). (Tbilisi, 2008) On a singular boundary value problem for the integro-differential equation – speaker.
31. International Conference on Modern Problems in Applied Mathematics. Dedicated to the 90-th anniversary of Iv. Javakhishvili Tbilisi State University (TSU) and 40-th anniversary of I. Vekua Institute of Applied Mathematics (VIAM). (Tbilisi, Georgia, 2008) – (with G. Kvinikadze) speaker.
32. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics (Tbilisi, Georgia, 2009) speaker.
33. Enlarged Sessions of the Seminar of I. Vekua Institute of Applied Mathematics (Tbilisi, Georgia, 2009) – (with S. Bitsadze) speaker.
34. The 6th International Conference: Dynamical Systems and Applications-2010 (Antalya–Turkey, 2010) - speaker.
35. Functional Differential Equations and Applications (Ariel, Israel, 2010) - invite-lecture.

LIST OF PUBLICATIONS:

1. On asymptotic behaviour of solutions of a system of two linear differential equations. (Russian) *Trudy Tbilis. Univ. Ser. Mat. Mekh.* **129** (1968), 179-194.
2. On oscillatory solutions of the second order differential equations with a delayed argument. (Russian) *Theses of reports of the III-rd Scientific Session of the Institute of Applied Mathematics of Tbilisi State University*, 1971, 5.
3. A note on oscillation of solutions of second order differential equations with a delayed argument. (Russian) *Mat. Časopis Sloven. Akad. Vied* **22** (1972), No. 3, 253-261.
4. * On oscillatory solutions of second order delay differential inequalities. *J. Math. Anal. Appl.* **42** (1973), No. 1, 148-157.
5. The oscillating solutions of nonlinear first order differential equations with retarded argument. (Russian) *Soobshch. Akad. Nauk Gruzin. SSR*, **70** (1973), No 1, 17-20.
6. * The existence of oscillatory solutions of second order nonlinear differential equations with retarded argument. (Russian) *Dokl. Akad. Nauk SSSR* **210** (1973), No. 2, 260-262.
7. * A note on the conjugacy of the solutions of higher order differential inequalities and equations with retarded argument. (Russian) *Differentsial'nye Uravneniya* **10** (1974), No. 8, 1400-1405.
8. The oscillatory nature of the solutions of differential inequalities and second order differential equations with retarded argument. (Russian) *Math. Balkanica* **29** (1975), No. 5, 163-172.
9. The oscillation of the solutions of a certain n -th order differential inequality with retarded argument (Russian) *Ukrain. Mat. Zh.* **28** (1976), No. 2, 233-237.
10. *Some properties of the solutions of nonlinear differential inequalities and equations with retarded argument. (Russian) *Differentsial'nye Uravneniya* **12** (1976), No. 11, 1971-1984.
11. On oscillatory properties of differential equations with a deviating argument. (Russian) *Izdat. Tbilis. Univ., Tbilisi*, 1977, 115 pp. (with T.A. Chanturia).
12. Bounded solutions of nonlinear second-order differential equations with retarded argument. (Russian) *Asymptotic behavior of solutions of functional-differential equations (Russian)*, 78-82, 155, *Akad. Nauk Ukrain. SSR, Inst. Mat., Kiev*, 1978.
13. Oscillatory solutions of differential inequalities and higher order equations with retarded argument. (Russian) *Soobshch. Akad. Nauk Gruzin. SSR* **89** (1978), No. 1, 37-39.
14. On oscillatory solutions of the linear second order differential equation with a delayed argument. (Russian) *Theses of reports of the V-th All-Union Conference on Qualitative Theory of Differential Equations. Kishinev*, 1979, 95.

15. Monotone solutions of first-order nonlinear differential equations with retarded argument. (Russian) *Tbiliss. Gos. Univ. Inst. Prikl. Mat. Trudy* **8** (1980), 24-28.
16. * On asymptotic behaviour of solutions of second order linear differential equations with a delayed argument. (Russian) *Differentsial'nye Uravneniya* **16** (1980), No. 11, 1963-1966.
17. * Oscillating and monotone solutions of first-order differential equations with deviating argument. (Russian) *Differentsial'nye Uravneniya* **18** (1982), No. 8, 1463-1465 (with T.A. Chanturia).
18. Zeros of solutions of first-order differential equations with retarded argument. (Russian) *Tbiliss. Gos. Univ. Inst. Prikl. Mat. Trudy* **14** (1983), 128-134.
19. On oscillatory solutions of the second order differential inequality with a delayed argument. (Russian) *Theses of reports of the X- th Republican Scientific-Methodic Conference of Mathematicians of Higher Educational Institutions of the Georgian SSR*, 1983, 92.
20. Integral conditions for the oscillation of solutions of second-order differential equations with retarded argument. (Russian) *Soobshch. Akad. Nauk Gruzin. SSR* **118** (1985), No. 2, 245-247.
21. On the question of the oscillation of solutions of higher-order differential equations with delay. (Russian) *Reports of the extended sessions of a seminar of the I. N. Vekua Institute of Applied Mathematics, Vol. I, No. 3 (Russian) (Tbilisi, 1985)*, 65-68, 168, *Tbilis. Gos. Univ., Tbilisi*, 1985.
22. Conditions for the oscillation of solutions of n -th order differential equations with retarded argument. (Russian) *Soobshch. Akad. Nauk Gruzin. SSR* **124** (1986), No. 1, 33-35.
23. Criteria for the oscillation of solutions of differential inequalities and second-order equations with retarded argument. (Russian) *Tbiliss. Gos. Univ. Inst. Prikl. Mat. Trudy* **17** (1986), 104-120.
24. *On oscillatory properties of n -th order differential equations with a delayed argument. (Russian) *Uspekhi Mat. Nauk* **41** (1986), No. 4, 1399.
25. On oscillatory solutions of essentially nonlinear high order differential equations with delay. (Russian) *Theses of reports of the VI- th All-Union Conference on Qualitative Theory of Differential Equations. Irkutsk*, 1986, 96-97.
26. Integral criteria of oscillation of solutions of n -th order differential inequalities and equations with a delayed argument. (Russian) *Tbiliss. Gos. Univ. Inst. Prikl. Mat. Trudy* **22** (1987), 110-134.
27. On the oscillation of solutions of differential equations with delay. (Russian) *Theses of reports of the IIIrd Ural Regional Conference in Functional Differential Equations and Their Application*, 1988.
28. On asymptotic behaviour of solutions of n -th order differential equations with a delay. (Russian) *Reports of Enlarged Sessions of the Seminar of I.N. Vekua Inst. Appl. Math.* **3** (1988), No. 3, 65-69.
29. * Differential equations with deviating argument that have the properties **A** and **B**. (Russian) *Differentsial'nye Uravneniya* **25** (1989), No. 11, 1897-1909; English transl.: *Differential Equations* **25** (1989), No. 11, 1332-1342 (1990).

30. *On oscillation of solutions of n -th order differential equations with a deviating argument. (Russian) *Differentsial'nye Uravneniya* **25** (1989), No. 12, 2184.
31. Monotonically increasing and oscillating solutions of differential equations with deviating argument. (Russian) *Soobshch. Akad. Nauk Gruzin. SSR* **137** (1990), No. 1, 41-44.
32. On Kneser solutions of n -th order differential equations with a delayed argument. (Russian) *Reports of Enlarged Sessions of the Seminar of I. Vekua Inst. Appl. Math.* **5** (1990), No. 3, 89-93.
33. Specific properties of solutions of differential equations with deviating argument. (Russian) *Ukrain. Mat. Zh.* **43** (1991), No. 1, 60-67; English transl.: *Ukrainian Math. J.* **43** (1991), No. 1, 48-54.
34. Monotone and oscillating solutions of n th-order differential equations with retarded argument. (Russian) *Math. Bohem.* **116** (1991), No. 3, 296-308.
35. On monotone and oscillatory solutions of high order retarded ordinary differential equations. *Reports of Enlarged Session of the Seminar of I. Vekua Inst. Appl. Math.* **7** (1992), No. 3, 57-59.
36. On oscillatory and Kneser-type solutions of the high order delay differential equations. *Bull. Acad. Sci. Georgia* **148** (1993), No. 2, 169-171 (with D. Izyumova).
37. On the oscillation of solutions of first order delay differential inequalities and equations. *Georgian Math. J.* **1** (1994), No. 6, 675-685 (with G.Kvinikadze).
38. On oscillatory properties of solutions of functional differential equations. *Mem. Differential Equations Math. Phys.* **3** (1994), 3-179.
39. On asymptotic behaviour of solutions of functional-differential equations. *Equadiff 8 (Bratislava, 1993). Tatra Mt. Math. Publ.* **4** (1994), 143-146.
40. On oscillatory properties of the solutions of Emden-Fowler type functional differential equations. *Fifth International Colloquium on Differential Equations, Plovdiv, Bulgaria, 1994*, 110.
41. On asymptotic behaviour of solutions of linear functional differential equations. *Mem. Differential Equations Math. Phys.* **6** (1995), 116-118.
42. Criteria for oscillation of solutions of two-dimensional differential systems with deviating arguments, *Mem. Differential Equations Math. Phys.* **6** (1995), 119-120. (Jointly with N.Partsvania)
43. * Oscillation properties of solutions of functional-differential equations. (Russian) *Dokl. Akad. Nauk* **340** (1995), No. 4, 473-475.
44. * On oscillatory properties of solutions nonlinear of functional-differential equations. (Russian) *Differentsial'nye Uravneniya* **31** (1995), No. 9, 1594-1595.
45. On oscillation of second order linear difference equations with deviated arguments. *Mem. Differential Equations Math. Phys.* **10** (1997), 138-139 (jointly with G. Kvinikadze).
46. * An analogue of Nehari's theorem for high order deviating differential equations. (Russian) *Differentsial'nye Uravneniya* **33** (1997), No. 11, 1572-1573.
47. * Oscillation properties of the solutions of the second order differential equations with a delayed argument. (Russian) *Differentsial'nye Uravneniya* **33** (1997), No. 10, 1312-1320; English transl.: *Differential Equations* **33** (1997), No. 10, 1318-1326 (1998) (jointly with N. Partsvania).

48. On the oscillation of solutions of two-dimensional linear differential systems with deviated arguments. *Mem. Differential Equations Math. Phys.* **13** (1998), 148-149 (jointly with N. Partsvania).
49. Comparison theorems for deviated differential equations with Property *A*. *Mem. Differential Equations Math. Phys.* **15** (1998), 141-144.
50. * Comparison theorems for ordinary differential equations with high order. *Differentsial'nye Uravneniya.* **34** (1998), No. 11, 1572-1573.
51. Oscillatory behaviour of solutions of two-dimensional differential systems with deviated arguments. *Georgian Math. J.* **6**(1999), No. 4, 335-346 (jointly with N. Partsvania).
52. Comparison theorems for deviated differential equations with property *B*. *Mem. Differential Equations Math. Phys.* **16**(1999), 143-147.
53. Properties *A* and *B* of *n*th order linear differential equations with deviated argument. *Georgian Math. J.* **6**(1999), No. 6, 553-566 (jointly with G. Kvinikadze and I. P. Stavroulakis).
54. Oscillation of second order linear delay differential equations. *Funct. Differ. Equ.* **7**(2000), No. 1-2, 121-145 (jointly with G. Kvinikadze and I. P. Stavroulakis).
55. *On a problem of I. T. Kiguradze and T. A. Chanturia. *Differentsial'nye Uravneniya.* **35** (1999), No. 11, 1571-1572.
56. *n*th order neutral differential equations. *Georgian Math. J.* **7**(2000), No. 2, 287-298 (jointly with M. K. Grammatikopoulos).
57. Oscillatory properties of solutions of two-dimensional linear differential systems with deviated arguments. *Reports of Enlarged Session of the Seminar of I. Vekua Institute of Applied Mathematics* **15** (2000), No. 1-3, 68-70 (jointly with N. Partsvania).
58. Comparison theorems for differential equations with several deviations. The case of property *A*. *Mem. Differential Equations Math. Phys.* **24**(2001), 115-124.
59. Property *A* of high order linear differential equations with several deviations. *Mem. Differential Equations Math. Phys.* **24** (2001), 125-135.
60. Oscillation of linear difference equations with deviating arguments. *Comp. Math. Appl.* **42** (2001), 477-486.
61. Comparison theorems for differential equations with several deviations. The case of property *B*. *Mem. Differential Equations Math. Phys.* **26** (2002), 139-148.
62. Oscillation of second order linear difference equations with deviating arguments. *Adv. Math. Sci. Appl.* **12** (2002), No. 1, 217-226 (jointly with G. Kvinikadze and I. P. Stavroulakis).
63. Comparison theorems for deviated difference equations. *Rep. Enlarges Sess. Semin. I. Vekua Inst. Appl. Math.* **17** (2002), No. 2, 43-46.
64. On asymptotic behavior of solutions of higher order linear differential equations with deviated arguments. *Rep. Enlarges Sess. Semin. I. Vekua Inst. Appl. Math.* **17** (2002), No. 2, 39-42 (jointly with G. Kvinikadze).
65. * Linear functional differential equations with Property *A*. *J. Math. Anal. Appl.* **284** (2003), No. 1, 294-314 (jointly with M. K. Grammatikopoulos and G. Kvinikadze).
66. On the oscillation of solutions of first order differential equations with retarded arguments. *Georgian Math. J.* **10** (2003), No. 1, 63-76 (jointly with M. K. Grammatikopoulos and I. P. Stavroulakis).

67. Asymptotic behaviour of solutions of two-dimensional linear differential systems with deviating arguments. *Arch. Math. (Brno)* **39** (2003), No. 3, 213-232 (jointly with N. Partsvania and I. P. Stavroulakis).
68. On Higher Order Functional Differential Equations with Property A. *Georgian Math. J.* **11** (2004), No. 2, 307-336.
69. Generalized ordinary differential equations of Emden-Fowler type with properties A and B. *Proc. A. Razmadze Math. Inst.* **136** (2004), 145-148.
70. * Nonlinear functional differential equations with Properties A and B. *J. Math. Anal. Appl.* **306** (2005), 136-160 (jointly with J. Graef and G. Kvinikadze).
71. On oscillatory properties of generalized ordinary differential equations of Emden-Fowler type. *Mem. Differential Equations Math. Phys.* **34** (2005), 153-156 (jointly with G. Kvinikadze).
72. * Quasi-Linear Functional Differential Equations with Property A. *J. Math. Anal. Appl.* **330** (2007), 483-510.
73. * On the Kneser type Solutions for Two-Dimensional Linear Differential Systems with Deviating Arguments. *J. Inequal. Appl.* 2007, 22 pp. (with A. Domoshnitsky).
74. On Oscillatory Properties of Solutions of Generalized Emden-Fowler Type Differential Equations. *Proc. A. Razmadze Math. Inst.* **145** (2007), 117—121.
75. * On an approach to the investigation of the asymptotic properties of solution of ordinary differential equations with delay (with G. Berikelashvili and O. Jokhadze). *Differ. Uravn.* **44** (2008), no. 1, 19--38, 141.
76. * Oscillation Criteria of First Order Linear Difference Equation with Delay Argument (with G. E. Chatzarakis and I. P. Stavroulakis). *J. Nonlinear Analysis* **68** (2008), 994-1005.
77. * Optimal Oscillation Criteria for First Order Difference Equation with Delay Argument (with G. E. Chatzarakis and I. P. Stavroulakis). *J. Pacific Journal Mathematics.* **235** (2008), 101-119.
78. On asymptotic behaviors of solutions of Emden-Fowler advanced differential equation. *Math. Modeling and Computer Simulation of Matherial Technologies. Proceedings of the 5-th International Conference Ariel*, **2** (2008), 731-735.
79. Existence of oscillating solution for the integro-differential equation. *Proc. A. Razmadze Math. Inst.* **147**(2008), 119-125 (with A. Domoshnitsky).
80. Oscillation criteria of solutions of second order of linear difference equations. *Proc. A. Razmadze Math. Inst.* **147** (2008), 134-138 (with G. Kvinikadze).
81. * Necessary conditions for existence of positive solutions of second order linear difference equations and sufficient conditions for oscillation of solutions. *J. Nelīnīnī. Koliv.* **12** (2009), no. 2, 180--194. (with G. Kvinikadze).
82. Oscillation criteria for higher order “almost linear” functional differential equation. *Funct. Differ. Equ.* **16** (2009), no. 3, 387--434. (with E. Litsyn).
83. * On Asymptotic Behavior of Solutions of Almost Linear and Essentially Nonlinear Differential Equations. *Nonlinear Anal. Theory, Methods and Appl.* 71 (2009),e396-e400.

84. On oscillatory properties of solutions of third-dimensional linear differential systems with deviating arguments. *Proc. A. Razmadze Math. Inst.* **149**(2009), 126-129 (with G. Giorgadze).
85. Essentially nonlinear generalized differential equations of Emden-Fowler type with delay argument. *Reports of Seminar of I. Vekua Institute of Applied Mathematics* **35** (2009).
86. Necessary conditions for existence of positive solutions of nonlinear difference equations. *Reports of Seminar of I. Vekua Institute of Applied Mathematics. Reports* **35** (2009), 68-70 (with I. Nanobashvili).
87. On asymptotic behavior of solutions of third-dimensional linear differential systems with deviating arguments. *Reports of Seminar of I. Vekua Institute of Applied Mathematics* **35**(2009), 60-63 (with G. Giorgadze).
88. * On asymptotic behavior of solutions of n-th order Emden-Fowler differential equations with advanced argument. *Czech. Math. J.* **60** (135) (2010), 817-633.
89. * On a boundary value problem for integro-differential equations on the halfline.. *Nonlinear Anal.* **72** (2010), no. 2, 836—846 (with A. Domoshnitsky).
90. First Order Linear Differential Equations With Several Delays *Proc. A. Razmadze Math. Inst.* **154** (2010), 151-154 (with G. Kvinikadze and A. Arsenashvili) .
91. * Necessary Conditions for Existence of Positive Solutions of Second Order Nonlinear Difference Equations and Sufficient Conditions for Oscillation of Solutions. *Advances in Mathematics.* (submission, with S. Pinelas).