

## Vakhtang Lomadze

Associate Professor at I. Javakhishvili Tbilisi State University  
Leading researcher at A Razmadze Tbilisi Mathematical Institute  
Phone (mobile): +995 599 45 05 23  
Email: [vakhtang.lomadze@tsu.ge](mailto:vakhtang.lomadze@tsu.ge), vakholoma@yahoo.com

### Education and Scientific Degrees

Moscow State University	1969-1973	Undergraduate student
Moscow State University	1973	Received the Master Diploma
Steklov Inst. of Math. in Moscow	1976-1979	PhD student
Steklov Inst. of Math. in Moscow	1981	Received the Ph.D.
Tbilisi State University	1995	Received the Doctor Degree of Sciences

### Research Interests

Multidimensional linear dynamical systems  
Behavioral Control Theory  
Algebraic Analysis

### Teaching Courses

Algebraic Curve Theory  
Homological Algebra  
Elements of Modern Algebra  
Tensor Analysis and Differential Geometry

### Grants and Honors

International Science Foundation Grant # RVJ000  
International Science Foundation Grant # RVJ200  
INTAS Grant # 96-0713  
INTAS Grant # 00-259  
TMR Grant # CT-97-0107  
EPSRC Grant # GR/M29122  
Grants of the Georgian Academy of Sciences

### Conferences and Symposiums

Conference on Algebraic Geometry (1988), Berlin  
Conference on Different Aspects of Differentiability (1995), Warsaw  
Conference on Systems and Control (1995), Groningen  
Intern. Symposium on Mathematical Theory of Networks and Systems (1996), St. Louis  
Intern. Symposium on Mathematical Theory of Networks and Systems (2000), Perpignan  
Second Intern. Workshop on Multidimensional Systems (2000), Zielona Gora  
IFAC Congress on Automatic Control (2001), Prague  
Intern. Symposium on Mathematical Theory on Networks and Systems (2002), Notre Dame  
Meeting on Linear Algebra and Applications (2003), Lisbon

### **Invited Talks**

Center for Mathematics and Computer Science in Amsterdam, The Netherlands (1995)  
University of Groningen, The Netherlands (1995 )  
East Carolina University, USA (1997 )  
University of Notre Dame, USA (1997)  
Ohio State University, USA (1997)  
Kaiserslautern University, Germany (1999)  
Innsbruck University, Austria (1999)  
University of Bilbao, Spain (2000)  
Kaiserslautern University, Germany (2000)  
Innsbruck University, Austria (2000)  
University of Bielefeld, Germany (2001)  
University of Southampton (2002)  
Abdus Salam International Center of Theoretical Physics in Italy (2004)  
University of Beer-Sheva, Israel (2004)

### **Publications**

- [67] V. Lomadze, On the Wiener-Hopf factorization of rational matrices, Trans. Razmadze Math. Inst. <http://dx.doi.org/10.1016/j.trmi.2017.09.001>
- [66] V. Lomadze, Converting high order linear PDEs to first order: Noncommutative case, Systems Contr. Letters 109 (2017) 49-52.
- [65] V. Lomadze, On the reduction of high order linear PDEs to first order, Linear Algebra Appl. 530 (2017) 1-14.
- [64] V. Lomadze, Converting high order linear PDEs to first order, Systems Contr. Letters 94 (2016) 107-110.
- [63] V. Lomadze, Proper representations of (multivariate) linear differential systems, Systems Contr. Letters 94 (2016) 25-30.
- [62] V. Lomadze, Taylor approximations of multidimensional linear systems, International J. of Control 89 (2016) 1091-1095.
- [61] V. Lomadze, Characterization of multidimensional LTI differential systems, Systems Contr. Letters 68 (2014) 20-24.
- [60] S. Akram, V. Lomadze, H. Mahmood, and K. Zafar, Addendum to "---", International J. of Control 87 (2014) 1312-1315.
- [59] S. Akram, V. Lomadze, H. Mahmood, and K. Zafar, (Singular) state models and (singular) LTID systems, International J. of Control 87 (2014) 567-580.
- [58] V. Lomadze, "Reduced polynomial matrices" in several variables, SIAM J. Control Optim. 51 (2013) 3258-3273.

- [57] V. Lomadze, PBH test for multivariate LTID systems, *Automatica* 49 (2013) 2933-2937.
- [56] V. Lomadze, Duality in the behavioral systems theory, *Automatica* 49 (2013) 1510-1514.
- [55] S. Akram, V. Lomadze, H. Mahmood, and K. Zafar, Smooth/Impulsive Linear Systems: Interconnections, *Int. J. Control* 86 (2013) 416-425.
- [54] V. Lomadze, A note on Ehrenpreis' fundamental principle, *LAA* 438 (2013) 2083-2089.
- [53] V. Lomadze, Linear systems and Taylor complexes, *SIAM J. Control Optim.* 50 (2012) 1721-1733.
- [52] V. Lomadze, Lifting discrete trajectories, *Applied Mathematics Letters* 25 (2012) 1716-1720.
- [51] V. Lomadze, Axiomatic characterization of linear differential systems (and operators), *Automatica* 48 (2012) 815-819.
- [50] V. Lomadze, Controllability as Minimality, *SIAM J. Control Optim.* 50 (2012) 357-367.
- [49] V. Lomadze, Behaviors and Symbols of Rational Matrices, *Systems Control Letters* 61 (2012) 98-106.
- [48] V. Lomadze, A note on interconnections, *Applied Mathematics Letters* 24 (2011) 1835-1839.
- [47] V. Lomadze, On homotopy and similarity in linear systems theory, *Acta Applic. Math.* 116 (2011) 87-105.
- [46] V. Lomadze, Rational differential operators and their kernels, *Linear Algebra Applic.* 435 (2011) 2870-2888.
- [45] V. Lomadze and H. Mahmood, Smooth/Impulsive Linear Systems: Controllability, *Int. J. Control* 84 (2011) 679-692.
- [44] V. Lomadze and M.K. Zafar, First order representations of Fliess models, *Linear Algebra Applic.* 434 (2010) 1027-1057.
- [43] V. Lomadze, Relative completeness and specifiedness properties of continuous linear dynamical systems, *Systems Control Letters* 59 (2010) 695-703.
- [42] V. Lomadze and M.K. Zafar, Linear systems, and ARMA- and Fliess models, *Int. J. of Control* 83 (2010) 2165-2180.
- [41] V. Lomadze and H. Mahmood, Smooth/Impulsive Linear Systems: Axiomatic Description, *Linear Algebra Applic.* 433 (2010) 1997-2009.
- [40] V. Lomadze, State representations of ARMA-models, *Int. J. Control* 83 (2010) 2091-2097.

- [39] V. Lomadze, How to define the dual of a higher-dimensional linear system, *Linear Algebra Appl.*, 431 (2009) 2084-2001.
- [38] V. Lomadze, ARMA-models and their equivalences, *Int. J. Control* 82 (2009) 2034-2039.
- [37] V. Lomadze, (Generalised) autoregressive models and their trajectories, *Int. J. of Control*, 82 (2009) 1929-1936.
- [36] S. Akram and V. Lomadze, On some basics of linear systems theory, *Systems Control Letters*, 58 (2009) 83-90.
- [35] S. Akram and V. Lomadze, Linear systems with locally integrable trajectories, *Linear Algebra Appl.*, 430 (2009) 2277-2289.
- [34] V. Lomadze, E. Rogers and J. Wood, Singular 2D Behaviors: Fornasini-Marchesini and Givone-Roesser Models, *Georgian Math. Journal*, 16 (2009) 105-130.
- [33] V. Lomadze, E. Rogers and J. Wood, Singular 2D Behaviors: Homologies, *Georgian Math. Journal*, 15 (2008) 139-157.
- [32] V. Lomadze, State and internal variables of linear systems, *Linear Algebra Appl.*, 425 (2007) 534-547.
- [31] V. Lomadze, When are linear systems differential?, *Linear Algebra Appl.*, 424 (2007) 540-554.
- [30] V. Lomadze, On the regular feedback interconnection problem, *International J. of Control*, 79 (2006) 858-865.
- [29] V. Lomadze, On duality for partial differential (and difference) equations, *Journal of Algebra*, 275 (2004), 791-800.
- [28] V. Lomadze, Linear dynamical systems: An axiomatic approach, *Georgian Math. Journal*, 9 (2002) 113-136.
- [27] V. Lomadze, Rosenbrock models and their homotopy equivalence, *Linear Algebra Appl.*, 351/352 (2002) 519-532.
- [26] E. Zerz and V. Lomadze, A constructive solution to interconnection and decomposition problems with multidimensional behaviors, *SIAM J. Control Optim.*, 40 (2001) 1072-1086.
- [25] V. Lomadze, Convolutional codes and frequency responses, *Georgian Math. Journal*, 8 (2001) 553-570.
- [24] V. Lomadze, Convolutional codes and coherent sheaves, *Appl. Algebra in Engineering, Communication and Computing*, 12 (2001) 273-326.
- [23] V. Lomadze, Singular linear behaviors and their AR-representations,

Math. Control Signals Systems, 14 (2001) 194-211.

[22] V.Lomadze and E. Zerz, Control and interconnection revisited: the linear multidimensional case, Second Int. Workshop on ND systems (Zielona Gora) 2000.

[21] V. Lomadze and E. Zerz, Fractional representations of linear systems, Syst. Control Letters 39 (2000) 275-281.

[20] V. Lomadze, Linear constant coefficient differential (or difference) equations, J. of Pure and Appl. Algebra, 147 (2000) 143-157.

[19] V. Lomadze, On state space representations of AR-models, Georgian Math. Journal, 7 (2000) 117-131.

[18] V. Lomadze, Time-varying linear dynamical systems, Proc. Georgian Acad. Sci., 119 (1999) 121-132.

[17] V. Lomadze, Applications of vector bundles to factorization of rational matrices, Linear Algebra Appl., 288 (1999) 249-258.

[16] V. Lomadze, M.S. Ravi, J. Rosenthal and J.M. Schumacher, A behavioral approach to singular systems, Acta Appl. Math. 54 (1998) 331--344.

[15] V. Lomadze, Linear system theory: An algebraist's point of view, Systems and Control Letters, 29 (1996) 73-80.

[14] V. Lomadze, Frequency responses, Bull. Georgian Acad. Sci., 157 (1998) 186-188.

[13] V. Lomadze, Linear dynamical systems: Compactness theorem, Systems and Control Letters, 23 (1994) 111-117.

[12] V. Lomadze, Linear systems of arbitrary genus, Acta Appl. Math. 34 (1994) 305-312.

[11] V. Lomadze, Linear dynamical systems of higher genus, Proc. Georgian Acad. Sci., 1 (1993) 565-584.

[10] V. Lomadze, Finite-dimensional time-invariant linear dynamical systems: Algebraic theory, Acta Appl. Math., 19 (1990) 149-201.

[9] V. Lomadze, On operational calculus, Bull. Georgian Acad. Sci., 140 (1990) 497-500.

[8] V. Lomadze, On generalized time-invariant dynamical linear systems, Bull. Acad. Sci. Georgian, 126 (1987) 261-264.

[7] V. Lomadze, Linear systems and coherent sheaves, Bull. Acad. Sci. Georgian SSR, 126 (1987) 37-40.

- [6] V. Lomadze, On quadratic forms over multidimensional local fields, *Mat. Zamet. Akad. Nauk SSSR*, 42 (1987) 353-357.
- [5] V. Lomadze, Ramification in extensions of multidimensional local fields, *Proc. A. Razmadze Math. Institute*, 57 (1985) 71-80.
- [4] V. Lomadze, Distributions of Noether spaces, *Bull. Acad. Sci. Georgian SSR*, 119 (1985) 465-468.
- [3] V. Lomadze, On residues in algebraic geometry, *Izv. Akad. Nauk SSSR*, 45 (1981) 1258-1287; English transl. in *Math. USSR Izv.* 19 (1982) 495-520.
- [2] V. Lomadze, On the intersection index of divisors, *Izv. Akad. Nauk SSSR*, 44 (1980), 1120-1130; English transl. in *Math. USSR Izv.* 17 (1981) 343-352.
- [1] V. Lomadze, On the ramification theory of two-dimensional local fields, *Matem. Sbornik Akad. Nauk SSSR*, 109 (1979) 378-394.

### **Conference papers**

- [1] V. Lomadze and M.S. Ravi, Wedderburn-Forney spaces and cohomology of coherent sheaves on the projective line, *Proceedings of MTNS Symposium (St. Louis) 1996*.
- [2] V. Lomadze, M.S. Ravi, J. Rosenthal and J.M. Schumacher, Realization of abstract behaviors, *Proceedings of MTNS Symposium (St. Louis) 1996*.
- [3] V. Lomadze and E. Zerz, Partial differential equations of Krull dimension zero, *Proceedings of MTNS Symposium (Perpignan) 2000*.
- [4] V. Lomadze, On the general linear control problem, *Proceedings of MTNS Symposium (Perpignan) 2000*.
- [5] V. Lomadze, Cauchy problem for multidimensional discrete linear systems, *Proceedings of MTNS Symposium (Perpignan) 2000*.
- [6] V. Lomadze and E. Zerz, Control and interconnection revisited: the linear multidimensional case, *Second Int. Workshop on ND systems (Zielona Gora) 2000*.
- [7] V. Lomadze, On Kalman models over a commutative ring, *Proceedings of MTNS Symposium (Notre Dame) 2002*.
- [8] V. Lomadze, On Rosenbrock models over a commutative ring, *Proceedings of MTNS Symposium (Notre Dame) 2002*.
- [9] V. Lomadze, On Fliess models over a commutative ring, *Proceedings of MTNS Symposium (Notre Dame) 2002*.