

Professor Ilya Krishtal

Northern Illinois University
Mathematical Sciences (MATH)
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Education

Ph.D., Voronezh State University, 2003.
Dissertation Title: Harmonic analysis of causal operators

MS, Voronezh State University, 2000.

BA, Voronezh State University, 1998.

Professional Positions

Professor, Northern Illinois University. (August 2016 - Present).

Visiting Professor, Vanderbilt University. (January 2019 - May 2019).

Visiting Professor, Catholic University of Eichstätt-Ingolstadt. (September 2018 - December 2018).

Associate Professor, Northern Illinois University. (August 2011 - July 2016).

Visiting Associate Professor, Vanderbilt University. (August 2011 - May 2012).

Assistant Professor, Northern Illinois University. (August 2006 - August 2011).

Chauvenet Lecturer, Washington University. (September 2003 - June 2006).

Research Assistant, Voronezh State University. (January 2003 - December 2003).

Lecturer, Voronezh Institute of Economics and Law. (January 2001 - July 2001).

TEACHING

Northern Illinois University

211, Calculus for Business and Social Science, 3 courses.

229, Calculus I, 4 courses.

232, Calculus III, 9 courses.

336, Ordinary Differential Equations, 9 courses.

360, Model Building in Applied Mathematics, 3 courses.

430, Advanced Calculus I, 3 courses.

431, Advanced Calculus II, 3 courses.

442, Elements of Partial Differential Equations, 1 course.

530, Advanced Calculus I, 1 course.

531, Advanced Calculus II, 3 courses.

542, Elements of Partial Differential Equations, 1 course.

630, Real Analysis I, 3 courses.

631, Real Analysis II, 4 courses.

697, Grad reading in Math Sci, 2 courses.

730, Topics in Analysis, 4 courses.

740, Topics in Applied Math, 1 course.

Vanderbilt University

175 (2300), Multivariable Calculus, 2 courses.
2420, Methods of Ordinary Differential Equations, 1 course.

Washington University in St. Louis

Accelerated Calculus I, 1 course.
Accelerated Calculus II, 1 course.
Ordinary Differential Equations, 2 courses.
Advanced Calculus I, 2 course.
Advanced Calculus II, 2 course.
Intro to Fourier Analysis, 1 course.

PUBLICATIONS

Book Chapters

Baskakov, A., Krishtal, I. (2018). Spectral Properties of an Operator Polynomial with Coefficients in a Banach Algebra. In Frames and harmonic analysis, volume 706 of *Contemporary Mathematics*, 93–114. Amer. Math. Soc., Providence, RI.

Aldroubi, A., Krishtal, I., Weber, E. (2015). Finite Dimensional Dynamical Sampling: an Overview. In Radu Balan, Matthew Begué, John J. Benedetto, Wojciech Czaja, Kasso Okoudjou (Ed.), *Excursions in Harmonic Analysis: The February Fourier Talks at the Norbert Wiener Center*. (vol. IV, pp. 231-244). www.springer.com/us/book/9783319201870

Journal Articles

Aldroubi, A., Krishtal, I., Tang, S. (in press). Phaseless reconstruction from space–time samples. *Applied and Computational Harmonic Analysis*. DOI: 10.1016/j.acha.2018.06.002.

Baskakov, A. G., Krishtal, I., Uskova, N. B. (2019). Similarity techniques in the spectral analysis of perturbed operator matrices. *J. Math. Anal. Appl.*, 477(2), 930–960.

Aldroubi, A., Huang, L., Krishtal, I., Lederman, R., Ledeczi, A., Volgyesi, P. (2018). On noise and unknown evolution operators in dynamical sampling. *Sampling Theory in Signal and Image Processing*. 17(2):153–182.

Baskakov, A. G., Krishtal, I., Uskova, N. B. (2018). Linear Differential Operator with an Involution as a Generator of an Operator Group. *Operators and Matrices*. 12(3), 723–756.

Baskakov, A. G., Krishtal, I., Romanova, E. Y. (2017). Spectral analysis of a differential operator with an involution. *Journal of Evolution Equations*, 17(2), 669-684. link.springer.com/article/10.1007/s00028-016-0332-8

Baskakov, A., Krishtal, I. (2017). Spectral analysis of abstract parabolic operators in homogeneous function spaces, II. *Mediterranean Journal of Mathematics*, 14:181, 13 pp.. doi.org/10.1007/s00009-017-0982-y

Aldroubi, A., Krishtal, I. (2016). Krylov subspace methods in dynamical sampling. *Sampl. Theory Signal Image Process.*, 16, 9-20. stsip.org

Baskakov, A., Krishtal, I. (2016). Spectral analysis of abstract parabolic operators in homogeneous function spaces. *Mediterranean Journal of Mathematics*, 13, 2443-2462. link.springer.com/article/10.1007/s00009-015-0633-0

- Krishtal, I., Strohmer, T., Wertz, T. (2015). Localization of Matrix Factorizations. *Foundations of Computational Mathematics*, 15(4), 931-951. link.springer.com/article/10.1007/s10208-014-9196-x
- Aldroubi, A., Davis, J., Krishtal, I. (2015). Exact Reconstruction of Signals in Evolutionary Systems via Spatiotemporal Trade-off. *Journal of Fourier Analysis and Applications*, 21(1), 11-31. link.springer.com/article/10.1007/s00041-014-9359-9
- Baskakov, A. G., Krishtal, I. (2014). Memory estimation of inverse operators. *Journal of Functional Analysis*, 267(8), 2551-2605. dx.doi.org/10.1016/j.jfa.2014.07.025
- Balan, R., Christensen, J., Krishtal, I., Okoudjou, K., Romero, J.-L. (2014). Multi-window Gabor frames in amalgam spaces. *Mathematical Research Letters*, 21(1), 55-69. dx.doi.org/10.4310/MRL.2014.v21.n1.a4
- Aldroubi, A., Davis, J., Krishtal, I. (2013). Dynamical sampling: Time-space trade-off. *Appl. Comput. Harmon. Anal./Elsevier*, 34, 495-503. dx.doi.org/10.1016/j.acha.2012.09.002
- Baskakov, A. G., Krishtal, I. (2013). On completeness of spectral subspaces of linear relations and ordered pairs of linear operators. *Journal of Mathematical Analysis and Applications*, 407(1), 157-178. dx.doi.org/10.1016/j.jmaa.2013.04.006
- Blanchard, J., Krishtal, I. (2012). Matricial Filters for Crystallographic Composite Dilation Wavelets. *Math. Comp./American Mathematical Society*, 81(278), 905-922. <http://www.ams.org/journals/mcom/2012-81-278/S0025-5718-2011-02518-4/>
- Krishtal, I. (2011). Wiener's lemma: pictures at an exhibition. *Revista de la Unión Matemática Argentina*, 52(2), 61-79. inmabb.criba.edu.ar/revuma/pdf/v52n2/v52n2a05.pdf
- Krishtal, I. (2011). Wiener's Lemma and memory localization. *J. Fourier Anal. Appl./Birkhäuser Boston*, 17(4), 674-690.
- Aldroubi, A., Krishtal, I., Tesserà, R., Wang, H. (2011). Principal shift-invariant spaces with extra invariance nearest to observed data. *Collect. Math./Springer*, 63 (2012)(3), 393-401. <http://www.springerlink.com/content/j249557236362651/>
- Balan, R., Krishtal, I. (2010). An almost periodic noncommutative Wiener's lemma. *J. Math. Anal. Appl.*, 370(2), 339-349.
- Acosta-Reyes, E., Aldroubi, A., Krishtal, I. (2009). On stability of sampling-reconstruction models. *Adv. Comp. Math.*, 31, 5-34.
- Krishtal, I., Okoudjou, K. (2008). Invertibility of the Gabor frame operator on the Wiener amalgam space. *J. Approx. Theory*, 153(2), 212-224.
- Aldroubi, A., Baskakov, A. G., Krishtal, I. (2008). Slanted matrices, Banach frames, and sampling. *J. Funct. Anal.*, 255(7), 1667-1691.
- Krishtal, I., Robinson, B., Weiss, G., Wilson, E. (2007). Some simple Haar-type wavelets in higher dimensions. *J. Geom. Anal.*, 17(1), 87-96.
- Baskakov, A. G., Krishtal, I. (2006). On harmonic analysis of causal operators. *Funct. Anal. Appl.*, 40(1), 52-55.
- Aldroubi, A., Krishtal, I. (2006). Robustness of sampling and reconstruction and Beurling-Landau type theorems for shift invariant spaces. *Appl. Comput. Harmon. Anal.*, 20(2), 250-260.

- Baskakov, A. G., Krishtal, I. (2005). Harmonic analysis of causal operators and their spectral properties. *Izvestiya: Mathematics*, 69(3), 439-486.
- Bakic', D., Krishtal, I., Wilson, E. (2005). Parseval frame wavelets with $E^{(2)}_n$ -dilations. *Appl. Comput. Harmon. Anal.*, 19(3), 386-431.
- Baskakov, A. G., Krishtal, I. (2005). Spectral analysis of operators with the two-point Bohr spectrum. *J. Math. Anal. Appl.*, 308(2), 420-439.
- Krishtal, I. (2002). On invertibility criteria in the algebra of causal operators. *Vestnik VSU: Physics, Mathematics*, (1), 143-150.
- Baskakov, A. G., Krishtal, I. (2002). On the Spectral Properties of Causal Operators. *Vestnik VSU: Physics, Mathematics*, (2), 39-43.
- Krishtal, I. (2000). Invertibility and causal invertibility of operators with the two-point Beurling spectrum. *Izvestiya Ross. Akad. Estestv. Nauk, Ser. MMMIU*, 4(4).
- Krishtal, I. (1998). On C^* -algebras generated by one or two idempotents. *Vestnik VSU: Physics, Mathematics*, (3), 238-242.

Conference Proceedings

- Aldroubi, A., Huang, L., Krishtal, I., Lederman, R. (2017). *Dynamical sampling with random noise* (pp. 409-412). IEEE Xplore, 2017 International Conference on Sampling Theory and Applications (SampTA). doi.org/10.1109/SAMPPTA.2017.8024372
- Aldroubi, A., Krishtal, I., Tang, S. (2017). *Phase retrieval of evolving signals from space-time samples* (pp. 46-49). IEEE Xplore, 2017 International Conference on Sampling Theory and Applications (SampTA). doi.org/10.1109/SAMPPTA.2017.8024353
- Krishtal, I. (2011). *Frames, Fusion Frames, And G-Frames - An Overview*. Singapore: SampTA. sampta2011.ntu.edu.sg/proceedings.asp
- Aldroubi, A., Baskakov, A. G., Krishtal, I. (2007). *On slanted matrices in frames theory* (67010Q ed., vol. 6701). "Wavelets XII" Proc. of SPIE.

GRANTS

- Krishtal, I. (Co-Principal), "Collaborative research: ATD: Dynamical sampling and reconstruction for sensing networks of physical fields," Sponsored by National Science Foundation. (October 1, 2013 - June 30, 2019).
- Krishtal, I. (Principal), "Matrix-like Representations in Time Frequency and Applied Harmonic Analysis," Sponsored by National Science Foundation. (September 1, 2009 - August 31, 2012).
- Krishtal, I., "A Preliminary study of mathematical modeling for pCT imaging," Sponsored by Northern Illinois University Research and Artistry, Northern Illinois University. (2009).

PROFESSIONAL SERVICE

- Director for public universities, MAA Illinois Section. (October 2014 - April 2017).