Curriculum Vitae
Maxim L. Yattselev

Business address

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402 North Blackford Street
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Positions

Associate Professor, Department of Mathematical Sciences, Indiana University Indianapolis, IN (Fall 2019 – current)

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Assistant Professor, Department of Mathematical Sciences, Indiana University-Purdue University Indianapolis, Indianapolis, IN (Fall 2013 – Summer 2019)

The Paul Olum Visiting Assistant Professor, Department of Mathematics, University of Oregon, Eugene, OR (Fall 2010 – Spring 2013)

Visiting Scholar, Center for Constructive Approximation, Department of Mathematics, Vanderbilt University, Nashville, TN (Fall 2009 - Spring 2010)

Post-doctoral Research Fellow, Project APICS, INRIA (The French National Institute for Research in Computer Science and Control), Sophia Antipolis, France (Fall 2007 - Spring 2009)

Education

Ph.D., Mathematics, Vanderbilt University, USA, (August 2002 - August 2007)
Advisor: Professor Edward B. Saff
Thesis: Non-Hermitian Orthogonality and Meromorphic Approximation

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M.S., Mathematics, Vanderbilt University, USA, May 2004
Advisor: Professor Edward B. Saff
Thesis: On Remez-Type Inequalities

M.S., Mathematics, Dnepropetrovsk National University, Ukraine, July 2001
Advisor: Professor Vitalii Motornyi
Thesis: Maximum of Modulus of One Family of Periodic Functions

B.S., Mathematics, Dnepropetrovsk National University, Ukraine, Sept. 2000

Advisor: Professor Sergei Pichugov

Thesis: Methods of Summation of Fourier Series

Research interests

Approximation Theory, Orthogonal Polynomials, Random Polynomials

Graduate Students

Ahmad Barhoumi: "Orthogonal Polynomials on S-Curves Associated with Genus One Surfaces", Ph.D., IUPUI, 2020

Hanan Aljubran: "On Random Polynomials Spanned by OPUC", Ph.D., IUPUI, 2020

Honors and Awards

Simons Collaboration Grant #706591 (September 2020 - August 2025)

AIM's research program SQuaREs (Structured Quartet Research Ensembles): "Dispersive PDEs with Randomness", May 2024, April 2025

NSF conference grant DMS–2331073: "Midwestern Workshop on Asymptotic Analysis", October 13-15, 2023; October 11-13, 2024

Simons Collaboration Grant #354538 (September 2015 - August 2020)

American Institute of Mathematics (AIM) Workshop: "Zeros of Random Polynomials", August 12-16, 2019

NSF conference grant DMS–1745012: "Midwestern Workshop on Asymptotic Analysis", October 6-8, 2017

AIM's research program SQuaREs (Structured Quartet Research Ensembles): "Random Polynomials with Bounded Height", June 15–19, 2015, September 12–16, 2016, and August 7–11, 2017

Professional Memberships

- Society for Industrial and Applied Mathematics (SIAM)
- SIAG on Orthogonal Polynomials and Special Functions Membership

Teaching Experiences

Discrete Mathematics, Beginners Calculus, Multivariate Calculus, Honors Calculus, Logic and the Foundations of Algebra, Ordinary Differential Equations, Linear Algebra, Introduction to Real Analysis, Complex Analysis (undergraduate and graduate courses), Real Analysis and Measure Theory (graduate course), Logarithmic Potential Theory (graduate course), Riemann Surfaces of Algebraic Functions (graduate course), Orthogonal Polynomials (graduate course), Classical Approximation Theory (graduate course).

Professional Service

Co-chair of the annual IU Indianapolis High School Math Contest

Co-organizer of the annual Midwestern Workshop on Asymptotic Analysis

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Reviewer for MathSciNet

Referee for Constructive Approximation Journal, Journal of Approximation Theory, Journal of Complex Analysis and Operator Theory, Journal of Mathematical Analysis and Applications, Journal Computational Methods and Function Theory, Mathematical Sbornik, Proceedings of the American Mathematical Society, Journal of Applied Mathematics and Computation, SIAM Journal on Mathematical Analysis.

Publications

Preprints

- A.I. Aptekarev and M.Y., Approximations of algebraic functions by rational ones – functional analogues of diophantine approximants, *Preprint of Keldysh Institute of Applied Mathematics*, RAS, Moscow, 2016. http://keldysh.ru/papers/2016/prep2016_84.pdf

- A.I. Aptekarev, S.A. Denisov, and M.Y., Completely integrable on $\mathbb{Z}_+^d$ potentials for electromagnetic Schrödinger operator: rays asymptotics and scattering problem, *Preprint of Keldysh Institute of Applied Mathematics*, RAS, Moscow, 2015. http://keldysh.ru/papers/2015/prep2015_88.pdf

- M.Y., Meromorphic approximation: symmetric contours and wandering poles, *survey*. http://math.iupui.edu/~maxyatts/publications/review.pdf

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Short Abstracts

- A.I. Aptekarev, S.A. Denisov, and M.L.Y., Discrete Schrödinger operator on a tree, Angelesco potentials, and their perturbations, *Proc. Steklov Inst. Math.* 311, 1–9, 2020. https://math.iupui.edu/~maxyatts/publications/steklov.pdf

- M.Y., S–Contours and Convergent Interpolation Research Perspectives CRM Barcelona, Fall 2019, vol. 12, in Trends in Mathematics, Springer-Birkhäuser, Basel. https://math.iupui.edu/~maxyatts/publications/safais.pdf

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Submitted

- L. Baratchart, H. Stahl, and M.Y., N-th root optimal rational approximants to functions with polar singular set

- A. Aptekarev, S. Denisov, and M.Y., Strong asymptotics of multiple orthogonal polynomials for Angelesco systems. Part I: Non–marginal directions

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Accepted

- M.Y., On an identity by Ercolani, Lega, and Tippings, *Contemp. Math.*

- A. Barhoumi, P. Bleher, A. Deaño, and M.Y., On Airy solutions of P_{II} and complex cubic ensemble of random matrices, II, *Contemp. Math.*

- A. Barhoumi, P. Bleher, A. Deaño, and M.Y., On Airy solutions of P_{II} and complex cubic ensemble of random matrices, I, *Orthogonal Polynomials, Special Functions and Applications — Proceedings of the 16th International Symposium, Montreal, Canada, In honor to Richard Askey*

Published

- A. Barhoumi and M.Y., Non-Hermitian orthogonal polynomials on a trefoil, *Constr. Approx.*, 59, 271–331, 2024

- M.Y., On smooth perturbations of Chebyshëv polynomials and $\bar{\partial}$-Riemann-Hilbert method, *Canad. Math. Bull.*, 66(1), 142-155, 2023. https://arxiv.org/abs/2202.10374

- A. Barhoumi, P. Bleher, A. Deaño, and M.Y., Investigation of the two-cut phase region in the complex cubic ensemble of random matrices, *J. Math. Phys.*, 63, 063303, 2022. https://arxiv.org/abs/2201.12871

- M.Y., On $L_{\mathbb{R}}^2$-best rational approximants to Markov functions on several intervals, *J. Approx. Theory*, 278, Paper No. 105738, 2022. https://arxiv.org/abs/2202.00800

- S.A. Denisov and M.Y., Spectral theory of Jacobi matrices on trees whose coefficients are generated by multiple orthogonality, *Adv. Math.*, 396, Paper No. 108114, 2022. https://arxiv.org/abs/2008.08210

- M.Y., On multipoint Padé approximants whose poles accumulate on contours that separate the plane, *Math. Notes*, 110(5), 784–795, 2021. https://arxiv.org/abs/2107.04758

- A.I. Aptekarev, S.A. Denisov, and M.Y., Jacobi matrices on trees generated by Angelesco systems: asymptotics of coefficients and essential spectrum, *J. Spectr. Theory*, 11(4), 1511–1597, 2021. https://arxiv.org/abs/2004.04113

- H. Aljubran and M.Y., An asymptotic expansion for the expected number of real zeros of Kac-Geronimus polynomials, *Rocky Mountain J. Math.*, 51(4), 1171–1188, 2021. https://arxiv.org/abs/2012.15055

- M.Y., Convergence of two-point Padé approximants to piecewise holomorphic functions, *Math. Sb.*, 212(11), 128–164, 2021. https://arxiv.org/abs/2104.13549

- A. Barhoumi and M.Y., Asymptotics of polynomials orthogonal on a cross with a Jacobi-type weight, *Complex Anal. Oper. Theory*, 14, article number 9, 2020. https://arxiv.org/abs/1911.10533

- A.I. Aptekarev, S.A. Denisov and M.Y., Self–adjoint Jacobi matrices on trees and multiple orthogonal polynomials, *Trans. Amer. Math. Soc.*, 373(2), 875–917, 2020 https://arxiv.org/abs/1806.10531

- H. Aljubran and M.Y., An asymptotic expansion for the expected number of real zeros of real random polynomials spanned by OPUC, *J. Math. Anal. Appl.*, 469, 428–446, 2019. https://arxiv.org/abs/1809.04948

- C.D. Sinclair and M.Y., The reciprocal Mahler ensembles of random polynomials, *Random Matrices Theory Appl.*, 8(4), 1950012, 38 pp, 2019. https://arxiv.org/abs/1806.02914

- M. Y. and A. Yeager, Zeros of real random polynomials spanned by OPUC, *Indiana Univ. Math. J.*, 68(3), 835–856, 2019. https://arxiv.org/abs/1711.07852

- M.Y., Symmetric contours and convergent interpolation, *J. Approx. Theory*, 225, 76–105, 2018. https://arxiv.org/abs/1706.02811

- P. Bleher, A. Deaño, and M.Y., Topological expansion in the complex cubic log-gas model. One-cut case. *J. Statist. Phys.*, 166(3-4), 784–827, 2017. http://arxiv.org/abs/1606.04303

- A.I. Aptekarev, A.I. Bogolubsky, and M.Y., Szegő-type asymptotics of Frobenius-Padé Approximants, *Math. Sb.*, 208(3), 4–27, 2017. http://arxiv.org/abs/1605.09672

- A.I. Aptekarev, W. Van Assche, and M.Y., Hermite–Padé approximants for a pair of Cauchy transforms with overlapping symmetric supports, *Comm. Pure Appl. Math.*, 70(3), 444–510, 2017. http://arxiv.org/abs/1505.03993

- M.Y., Strong asymptotics of Hermite-Padé approximants for Angelesco systems with complex weights, *Canad. J. Math.*, 68(5), 1159–1200, 2016. http://arxiv.org/abs/1507.07596

- A.I. Aptekarev and M.Y., Padé approximants for functions with branch points — strong asymptotics of Nuttall–Stahl polynomials, *Acta Math.*, 215(2), 217–280, 2015. http://arxiv.org/abs/1109.0332

- A.I. Aptekarev, D.N. Toulyakov, and M.Y., On a parametrization of a certain algebraic curve of genus 2, *Math. Notes*, 98(5), 843–846, 2015.

- M.Y., Nuttall's theorem with analytic weights on algebraic S-contours, *J. Approx. Theory*, 190, 73–90, 2015. http://arxiv.org/abs/1406.0832

- C.D. Sinclair and M.Y., Root statistics of random polynomials with bounded Mahler measure, *Adv. Math.*, 272, 124–199, 2015. http://arxiv.org/abs/1307.4128

- M.Y., Large deviations and linear statistics for potential theoretic ensembles associated with regular closed sets, *Probab. Theory Relat. Fields*, 156, 827–850, 2013. http://arxiv.org/abs/1207.0718

- L. Baratchart and M.Y., Asymptotics of Padé approximants to a certain class of elliptic-type functions, *J. Anal. Math.* 121,31–86, 2013 http://arxiv.org/abs/1205.4480

- C.D. Sinclair and M.Y., Universality for ensembles of matrices with potential theoretic weights on domains with smooth boundary, *J. Approx. Theory*, 164, 682–708, 2012. http://arxiv.org/abs/1108.3052

- L. Baratchart, H. Stahl, and M.Y., Weighted extremal domains and best rational approximation, *Adv. Math.* 229(1), 357–407, 2012. http://arxiv.org/abs/1108.4363

- M. Raghupathi and M.Y., Meromorphic extendibility and rigidity of interpolation, *J. Math. Anal. Appl.* 377(2), 828–833, 2011. http://arxiv.org/abs/1011.5003

- L. Baratchart and M.Y., Convergent interpolation to Cauchy integrals over analytic arcs with Jacobi-type weights, *Int. Math. Res. Not. IMRN* 2010, Art. ID rnq 026, pp. 65. http://arxiv.org/abs/0911.3850

- L. Baratchart and M.Y., Asymptotic uniqueness of best rational approximants to complex Cauchy transforms, *in Jorge Arvesú, Francisco Marcellán, and Andrei Martínez Finkelshtein, editors, Recent Trends in Orthogonal Polynomials and Approximation Theory*, volume 507 of Contemporary Mathematics, pages 87–111, Amer. Math. Soc., Providence, RI, 2010. http://arxiv.org/abs/0909.0461

- M.Y., On uniform approximation of rational perturbations of Cauchy integrals, *Comput. Methods Funct. Theory*, 10(1), 1–33, 2010. http://arxiv.org/abs/0906.0793

- L. Baratchart and M.Y., Convergent interpolation to Cauchy integrals over analytic arcs, *Found. Comput. Math.* 9(6), 675–715, 2009. http://arxiv.org/abs/0812.3919

- L. Baratchart and M.Y., Meromorphic approximants to complex Cauchy transforms with polar singularities, *Mat. Sb.* 200(9), 3–40, 2009. http://arxiv.org/abs/0806.4681

- V.A. Prokhorov, E.B. Saff, and M.Y., Ratios of norms for polynomials and connected n-width problems, *Complex Anal. Oper. Theory*, 3(2), 501–524, 2009. http://arxiv.org/abs/0804.3748

- L. Baratchart and M.Y., Multipoint Padé approximants to complex Cauchy transforms with polar singularities, *J. Approx. Theory*, 156(2), 187–211, 2009. `http://arxiv.org/abs/0804.2206`

- M.Y., On the multiplicity of singular values of Hankel operators whose symbol is a Cauchy transform on a segment, *J. Operator Theory*, 61(2), 239–251, 2009.

- M.Y., A note on the sharpness of the Remez-type inequality for homogeneous polynomials on the sphere, *Electron. Trans. Numer. Anal.* 25, 278–283, 2006.

- A. Kroó, E.B. Saff, and M.Y., A Remez-type theorem for homogeneous polynomials, *J. London Math. Soc.* 73(3), 783–796, 2006.

- M.Y., Inequality between four upper bounds of consecutive derivatives on a half line, *Visn. DGU Mathematics*, 4, 1998, 106–111 (in Russian).

Colloquium talks

- What do Painlevé equations have in common with graph enumeration on Riemann surfaces?
Department of Mathematics, *University of California Santa Cruz*, May 2024
- Spectral Theory Behind Multiple Orthogonal Polynomials
Department of Mathematical Sciences, *University of Cincinnati*, November 2023
Department of Mathematics, *Baylor University*, February 2019
Department of Mathematics, *Colorado State University*, January 2019
- On Rational Approximants of Multi-Valued Functions
Department of Mathematical Sciences, *IUPUI*, March 2023
- On Hermite-Padé Approximants and Transcendence of *e*
Department of Mathematics, Statistics, and Actuarial Sciences, *Butler University*, April 2022
- Hermite-Padé Approximation of Markov Functions
Department of Mathematics and Computer Science, *Eastern Illinois University*, November 2015
- Nuttall's Theorem for Padé Approximants
Department of Mathematical Sciences, *Indiana University-Purdue University Indianapolis*, January 2013
- Spurious Poles in Padé Approximation of Algebraic Functions
Fariborz Maseeh Department of Mathematics and Statistics, *Portland State University*, April 2012
Department of Mathematical Sciences, *Purdue University Fort Wayne*, February 2012
Department of Mathematics, *Oklahoma State University*, January 2012
- Padé Approximants for Functions with Branch Points
Department of Mathematics, *University of Oregon*, October 2011
- Convergent Interpolation to Cauchy Integrals

Department of Mathematics, *University of Oregon*, February 2010

Departamento de Matemáticas, *Universidad Carlos III de Madrid*, Spain, October 2008

● Rational Interpolation of Cauchy Integrals

Department of Mathematics and Statistics, *University of South Florida*, USA, January 2009

Plenary Conference Talks

● Advances in asymptotics of multiple orthogonal polynomials for Angelesco systems

Journées Approximation, 6th edition, Lille, France, May 2024

● On symmetric contours in rational interpolation

Orthogonal Polynomials and Applications, Leuven, Belgium, June 2023

● Spectral theory of Jacobi matrices on trees with coefficients generated by multiple orthogonality

Workshop on Jacobi Operators and Spectral Theory, São Carlos, Brazil, May 2022

● Symmetric contours and convergent interpolation

Spaces of Analytic Functions: Approximation, Interpolation, Sampling, CRM, Barcelona, Spain, November 2019

Analysis, Approximation Theory, Operator Theory and their Interconnections, Columbus, OH, March 2018

IV Iberoamerican Workshops on Orthogonal Polynomials and Applications, Uberaba, Brazil, May 2017

● On multiple orthogonal polynomials

Complex Analysis in Mathematical Physics and Applications, University of Cambridge, UK, October 2019

● Zero distribution of optimal rational approximants

An International Conference Dedicated to the Memory of Sergey Mergelyan, Yerevan, Armenia, May 2018

Invited Conference Talks

● Root statistics of random polynomials with bounded Mahler measure

Workshop on Random Functions, April 2021

● Self–adjoint Jacobi matrices on trees and multiple orthogonal polynomials

Workshop on Integrability and Nonlinear Dispersive Equations, CIRM, Luminy, France, June 2019

One-Dimensional Complex Analysis and Operator Theory, Euler Institute, St. Petersburg, Russia, May 2019

Contributed Conference Talks and Seminars

● On smooth perturbations of Chebyshëv polynomials and $\bar{\partial}$-Riemann-Hilbert method

35-st International Workshop on Operator Theory and Applications, Canterbury, UK, August 2024

● On Rational Approximants of Multi-Valued Functions

Geometry and Analysis Seminar, University of California Santa Cruz, May 2024

- On strong asymptotics of MOPs for Angelesco systems

Foundations of Computational Mathematics, Paris, France, June 2023

- On multipoint Padé approximants whose poles accumulate on contours that separate the plane

International Conference on Approximation Theory and Beyond, Nashville, TN, May 2023

Joint Mathematics Meeting, Boston, MA, January 2023

- On Hermite-Padé approximants for a pair of Cauchy transforms with overlapping symmetric supports

16 Conference on Orthogonal Polynomials, Special Functions and Application, on-line, June 2022

OPSFOTA on-line seminar, October 2020

- Zero distribution of optimal rational approximants

Joint Mathematics Meeting, January 2021

- Spectral theory of Jacobi matrices on trees whose coefficients are generated by multiple orthogonality

CAOPA on-line seminar, August 2020

- Asymptotics of the recurrence coefficients of MOPs for Angelesco systems

15 Conference on Orthogonal Polynomials, Special Functions and Application, Hagenberg, Austria, July 2019

- Self–adjoint Jacobi matrices on trees and multiple orthogonal polynomials

AMS Sectional Meeting, Ann Arbor, MI, October 2018

- Convergence of AAK approximants to algebraic functions

AMS Sectional Meeting, Nashville, TN, April 2018

- Root statistics of random polynomials with bounded Mahler measure

AMS Sectional Meeting, Bloomington, IN, April 2017

- Szegő-type Asymptotics of Frobenius-Padé Approximants

Joint Mathematics Meeting, Atlanta, GA, January 2017

- Hermite-Padé approximants for two Cauchy transforms with overlapping symmetric supports

First Joint Meeting Brazil-Spain in Mathematcs, Fortaleza, Brazil, December 2015

Selected Topic of Function Theory, Moscow, Russia, September 2015

- Nuttall's Theorem on Algebraic S-Contours

13 Conference on Orthogonal Polynomials, Special Functions and Application, Gaithersburg, MD, June 2015

- Strong Asymptotics of Hermite-Padé Approximants for Angelesco Systems with Complex Weights

Foundations of Computational Mathematics, Montevideo, Uruguay, December 2014

Constructive Functions, Nashville, TN, May 2014

- Meromorphic Extendibility and Rigidity of Interpolation

Constructive Functions, Nashville, TN, May 2014

- Nuttall's theorem on algebraic S-contours with analytic weights

Conference in memory of academic A.A. Gonchar, Moscow, RF, November 2013

- Large Deviations, Linear Statistics, and Scaling Limits for Mahler Ensemble of Complex Random Polynomials

International Conference on Approximation Theory and Applications, Hong Kong, May 2013

- Nuttall's Theorem on Algebraic S-Contours

AMS Southeastern Section Meeting, Oxford, MS, March 2013

- Bernstein-Szegő Polynomials on Algebraic S-Contours

Joint Mathematics Meeting, San Diego, CA, January 2013

- Weighted extremal Domains and H^2-Best Rational Approximants to Algebraic Functions

Workshop on Potential Theory and Applications, Szeged, Hungary, May 2012

26-th Southeastern Analysis Meeting, Atlanta, GA, March 2010

13-th International Conference in Approximation Theory, San Antonio, TX, March 2010

- Padé Approximants for Functions with Branch Points

11-th Conference on Orthogonal Polynomials, Special Functions and Application, Leganes, Spain, August 2011

- Asymptotics of Padé Approximants to a Certain Class of Elliptic–type Functions

International Symposium in Approximation Theory, Nashville, TN, March 2011

New Perspectives in Univariate and Multivariate Orthogonal Polynomials, B.I.R.S., Banff, Canada, October 2010

- Convergent Interpolation to Cauchy Integrals of Jacobi-Type Weights and RH$\bar{\partial}$-Problems

21-st International Workshop on Operator Theory and Applications, Berlin, Germany, July 2010

10-th Conference on Orthogonal Polynomials, Special Functions and Application, Leuven, Belgium, July 2009

ANR AHPI Meeting, Sophia Antipolis, France, April 2009

- Ratios of Norms for Polynomials and Connected n-Width Problems

Approximation Theory and Applications, Dnepropetrovsk, Ukraine, June 2010

25-th Southeastern Analysis Meeting, Tampa, FL, March 2009

- Asymptotics Uniqueness of L^2-Best Rational Approximants to Cauchy Integrals

Computational Methods and Function Theory 2009, Ankara, Turkey, June 2009

- Convergent Interpolation to Cauchy Integrals

Approximation, Modélisation Géométrique et Applications , C.I.R.M., Marseille, France, November 2008

- Strong Asymptotics for the Error of Rational Approximation in $L^2(\mathbb{T})$ for Cauchy Transforms

Modern Approaches to Asymptotics of Polynomials, B.I.R.S., Banff, Canada, November 2007

- On Convergence of AAK Approximants for Cauchy Transforms with Polar Singularities

Special Functions, Information Theory and Mathematical Physics, Granada, Spain, September 2007

- Strong Asymptotics for Non-Hermitian Orthogonal Polynomials on a Segment

9-th Conference on Orthogonal Polynomials, Special Functions and Application, C.I.R.M., Marseille, France, 2007

- On the Multiplicity of Singular Values of Hankel Operators whose Symbol is a Cauchy Transform on a Segment

Spaces of Analytic Functions and their Operators, C.I.R.M., Marseille, France, June 2006

- Strong Asymptotics on a Segment and its Application to Meromorphic Approximation

1015-th AMS Sectional Meeting, Miami, FL, April 2006

- A Remez-Type Theorem for Homogeneous Polynomials

Computational Methods and Function Theory 2005, Joensuu, Finland, June 2005