

1. Record Nr.	UNINA9910629291503321
Titolo	Analysis at large : dedicated to the life and work of Jean Bourgain // edited by Artur Avila, Michael Th. Rassias, Yakov Sinai
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
ISBN	3-031-05331-1
Descrizione fisica	1 online resource (388 pages)
Disciplina	780
Soggetti	Mathematicians Anàlisi matemàtica Teoria de grups Matemàtics Biografies Llibres electrònics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	Intro -- Preface -- Contents -- On the Joint Spectral Radius -- 1 Introduction -- 2 Extremal Norms and Barabanov Norms -- 3 Explicit Bounds for Theorem 2 -- 4 Explicit Bounds for Bochi's Inequalities -- 5 Ultrametric Complete Valued Fields -- References -- The Failure of the Fractal Uncertainty Principle for the Walsh-Fourier Transform -- 1 The Fractal Uncertainty Principle for the Fourier Transform -- 2 The Walsh Transform -- 3 The Main Result -- 4 Proofs -- References -- The Continuous Formulation of Shallow Neural Networks as Wasserstein-Type Gradient Flows -- 1 Introduction -- 2 Shallow Neural Network and Gradient Flows -- 2.1 The Formulation -- 2.2 Comparison Between the Continuous and Discrete Model -- Consistency -- 2.3 The $(, H)$ Formulation -- 3 PDE Formulations -- 3.1 Gradient Flow in the Formulation -- 3.2 A First PDE Approach in the $(, H)$ Formulation -- Separating Variables -- Transporting Along the Flow of $t$ -- 3.3 A Gradient Flow in the $(, H)$ Formulation via Propagation of Chaos -- 4 Regularized Problems -- 4.1 Heat Regularization -- 4.2 The Porous Medium Regularization -- 4.3 An Observation Without Regularization

-- 5 Open Questions -- 5.1 Regularity and Convergence -- 5.2 Multilayer Neural Networks -- References -- On the Origins, Nature, and Impact of Bourgain's Discretized Sum-Product Theorem -- 1 Overture -- 2 Origins: Kakeya-Besicovitch Problem+ -- 2.1 Some Fundamental Properties of Plane Sets of Fractional Dimension -- 2.2 Besicovitch Type Maximal Operators and Applications to Fourier Analysis -- 2.3 Balog-Szemerédi-Gowers Lemma -- 2.4 On the Dimension of Kakeya Sets and Related Maximal Inequalities -- 3 Sum-Product Phenomena and the Labyrinth of the Continuum -- 3.1 Freiman's Theorem and Ruzsa's Calculus -- 3.2 Sum-Product Phenomena and Incidence Geometry -- Crossing Number Inequality -- Szemerédi-Trotter Theorem. Proof of Sum-Product Inequality -- 3.3 On the Erdős-Volkmann and Katz-Tao Discretized Ring Conjectures -- Erdős-Volkmann Problem -- Katz-Tao Discretized Ring Conjecture -- Labyrinth of the Continuum -- 3.4 A Sum-Product Estimate in Finite Fields and Applications -- 4 Discrete and Continuous Variations on the Expanding Theme -- 4.1 Bemerkung über den Inhalt von Punktmengen -- 4.2 Sur le problème de la mesure -- 4.3 Ramanujan-Selberg Conjecture -- 4.4 Expanders -- 4.5 Superstrong Approximation -- 4.6 On the Spectral Gap for Finitely Generated Subgroups of  $SU(d)$  -- 5 Coda -- References -- Cartan Covers and Doubling Bernstein-Type Inequalities on Analytic Subsets of  $C^2$  -- 1 Introduction -- 2 Cartan's Estimate -- 3 Bernstein Exponent and Number of Zeros -- 4 Weierstrass' Preparation Theorem and Bernstein Exponents -- 5 Resultants -- 6 Refinement of the Assumption (1) -- 7 Proofs of Theorems A, B, and C -- References -- A Weighted Prékopa-Leindler Inequality and Sumsets with Quasicubes -- 1 Introduction -- 2 A Weighted Discrete Prékopa-Leindler Inequality -- 3 Proof of the Main Theorem -- References -- Equidistribution of Affine Random Walks on Some Nilmanifolds -- 1 Introduction -- 1.1 Quantitative Equidistribution -- 1.2 Statement of the Main Result -- 1.3 The Case of a Torus -- 1.4 Consequences of the Main Theorem -- 1.5 Idea of the Proof -- 2 Examples -- 2.1 Heisenberg Nilmanifold -- 2.2 Heisenberg Nilmanifold over Number Fields -- 2.3 A Non-semisimple Group of Toral Automorphisms -- 2.4 A Non-example -- 3 The Setup -- 3.1 Hölder Functions -- 4 The Main Argument -- 4.1 Principal Torus Bundle -- 4.2 Fourier Transform -- 4.3 Essential Growth Rate -- 4.4 The Cauchy-Schwarz Argument -- 4.5 Proof of the Key Proposition -- 5 Proof of the Main Theorems -- Appendix A: A Large Deviation Estimate -- Appendix B: The Case of a Torus. B.1 Multiplicative Convolutions in Simple Algebras -- B.2 Fourier Decay for Linear Random Walks -- B.3 Proof of Theorems B.1 and B.2 -- References -- Logarithmic Quantum Dynamical Bounds for Arithmetically Defined Ergodic Schrödinger Operators with Smooth Potentials -- 1 Introduction -- 2 Preliminaries -- 2.1 Schrödinger Operators and Transfer Matrices -- 2.2 Transport Exponents -- 2.3 Semialgebraic Sets -- 2.4 Large Deviation Theorems -- 3 Transport Exponents -- 4 Semialgebraic Sets -- 5 Technical Lemmas -- 6 The Case  $= 1$  -- 7 The Case  $>$  -- 1 -- 8 The Analytic Case -- 9 The Skew-Shift Case,  $>$  -- 1 -- References -- The Slicing Problem by Bourgain -- 1 Introduction -- 2 The Isotropic Position -- 3 Distribution of Volume in Convex Bodies -- 4 Bound for the Isotropic Constant -- References -- On the Work of Jean Bourgain in Nonlinear Dispersive Equations -- 1 Introduction -- 2 Nonlinear Dispersive Equations: The Well-Posedness Theory Before Bourgain -- 3 Bourgain's Transformative Work on the Well-Posedness Theory of Dispersive Equations -- 4 A Quick Sampling of Some of the Other Groundbreaking Contributions of Bourgain to Nonlinear Dispersive Equations -- 4.1 Gibbs Measure

Associated to Periodic (NLS) -- 4.2 Bourgain's "High-Low Decomposition" -- 4.3 Bourgain's Work on the Defocusing Energy Critical (NLS) -- 5 Conclusion -- References -- On Trace Sets of Restricted Continued Fraction Semigroups -- 1 Introduction -- 1.1 McMullen's Arithmetic Chaos Conjecture -- 1.2 Thin Semigroups -- 1.3 The Local-Global and Positive Density Conjectures -- 1.4 Statements of the Main Theorems -- 1.5 Notation -- 2 Preliminary Remarks -- 3 Proof of Theorem 1.5 -- 4 Proof of Theorem 1.6 -- 5 Proof of Lemma 1.9 -- References -- Polynomial Equations in Subgroups and Applications -- 1 Introduction -- 1.1 Background and Motivation -- 1.2 New Results.

2 Solutions to Polynomial Equations in Subgroups of Finite Fields -- 2.1 Stepanov's Method -- 2.2 Some Divisibilities and Non-divisibilities -- 2.3 Derivatives on Some Curves -- 2.4 Multiplicity Points on Some Curves -- 3 Small Divisors of Integers -- 3.1 Smooth Numbers -- 3.2 Number of Small Divisors of Integers -- 4 Proof of Theorem 1.2 -- 4.1 Preliminary Estimates -- 4.2 Optimization of Parameters -- 5 Proof of Theorem 1.6 -- 5.1 Outline of the Proof -- 5.2 Formal Argument -- 6 Comments -- References -- Exponential Sums, Twisted Multiplicativity, and Moments -- 1 Introduction -- 1.1 Exponential Sums with Polynomials -- 1.2 Sums of Twisted Multiplicative Functions -- 1.3 Non-correlation of Exponential Sums for Different Polynomials -- 1.4 Previous Work -- 2 Sums of Twisted Multiplicative Functions -- 3 Exponential Sums of Polynomials: Preliminary Results -- 4 Proof of Theorem 1.1 -- 5 The Fourth Moment: Proof of Theorem 1.3 -- 6 Generic Polynomials -- 7 Multiple Correlations -- 8 Remarks on Katz's Theorem -- References -- The Ternary Goldbach Problem with a Missing Digit and Other Primes of Special Types -- 1 Introduction -- 2 Outline of the Proof -- 3 Structure of the Paper -- 4 Sieve Decomposition and Proof of Theorem 1.1 -- 5 Fourier Estimates and Large Sieve Inequalities -- 6 Local Versions of Maynard's Results -- 7 Sieve Asymptotics for Local Version of Maynard -- 8 b-Variable Circle Method -- 9 b-Variable Major Arcs -- 10 Generic Minor Arcs -- 11 Exceptional Minor Arcs -- 12 The Ternary Goldbach Problem with a Prime with a Missing Digit, a Piatetski-Shapiro Prime, and a Prime of Another Special Type -- References -- A Note on Harmonious Sets -- 1 A Wrong Lemma Is Revisited -- 2 Bogolyobov's Approach -- 3 New Examples of Harmonious Sets -- 4 The Union of Two Harmonious Sets -- References.

On the Multiplicative Group Generated by Two Primes in  $\mathbb{Z}/Q\mathbb{Z}$  -- 1 Introduction -- 1.1 Notation -- 2 Proof of Theorem 4 -- References.

---