

1. Record Nr.	UNINA9910830377603321
Autore	Damelin Steven B.
Titolo	Near Extensions and Alignment of Data in R^n : Whitney Extensions of near Isometries, Shortest Paths, Equidistribution, Clustering and Non-Rigid Alignment of Data in Euclidean Space // Steven B. Damelin
Pubbl/distr/stampa	Hoboken, NJ : , : John Wiley & Sons Ltd, , [2024] ©2024
ISBN	1-394-19681-4 1-394-19679-2
Edizione	[First edition.]
Descrizione fisica	1 online resource (186 pages)
Disciplina	516.3
Soggetti	Geometry, Analytic Mathematical analysis Rigidity (Geometry) Nomography (Mathematics) Euclidean algorithm Isometries (Mathematics)
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Intro -- Near Extensions and Alignment of Data in R^n -- Contents -- Preface -- Overview -- Structure -- 1 Variants 1-2 -- 1.1 The Whitney Extension Problem -- 1.2 Variants (1-2) -- 1.3 Variant 2 -- 1.4 Visual Object Recognition and an Equivalence Problem in R^n -- 1.5 Procrustes: The Rigid Alignment Problem -- 1.6 Non-rigid Alignment -- 2 Building -distortions: Slow Twists, Slides -- 2.1 c -distorted Diffeomorphisms -- 2.2 Slow Twists -- 2.3 Slides -- 2.4 Slow Twists: Action -- 2.5 Fast Twists -- 2.6 Iterated Slow Twists -- 2.7 Slides: Action -- 2.8 Slides at Different Distances -- 2.9 3D Motions -- 2.10 3D Slides -- 2.11 Slow Twists and Slides: Theorem 2.1 -- 2.12 Theorem 2.2 -- 3 Counterexample to Theorem 2.2 (part (1)) for card $(E) \times \mathbb{R}^d$ -- 3.1 Theorem 2.2 (part (1)), Counterexample: $k > d$ -- 3.2 Removing the Barrier $k > d$ in Theorem 2.2 (part (1)) -- 4 Manifold Learning, Near-isometric Embeddings, Compressed Sensing, Johnson-Lindenstrauss and Some Applications Related to the near Whitney

extension problem -- 4.1 Manifold and Deep Learning Via c -distorted Diffeomorphisms -- 4.2 Near Isometric Embeddings, Compressive Sensing, Johnson-Lindenstrauss and Applications Related to c -distorted Diffeomorphisms -- 4.3 Restricted Isometry -- 5 Clusters and Partitions -- 5.1 Clusters and Partitions -- 5.2 Similarity Kernels and Group Invariance -- 5.3 Continuum Limits of Shortest Paths Through Random Points and Shortest Path Clustering -- 5.3.1 Continuum Limits of Shortest Paths Through Random Points: The Observation -- 5.3.2 Continuum Limits of Shortest Paths Through Random Points: The Set Up -- 5.4 Theorem 5.6 -- 5.5 p -power Weighted Shortest Path Distance and Longest-leg Path Distance -- 5.6 p -wsp, Well Separation Algorithm Fusion -- 5.7 Hierarchical Clustering in \mathbb{R}^d -- 6 The Proof of Theorem 2.3 -- 6.1 Proof of Theorem 2.3 (part(2)). 6.2 A Special Case of the Proof of Theorem 2.3 (part (1)) -- 6.3 The Remaining Proof of Theorem 2.3 (part (1)) -- 7 Tensors, Hyperplanes, Near Reflections, Constants (ϵ, δ, K) -- 7.1 Hyperplane -- We Meet the Positive Constant -- 7.2 "Well Separated" -- We Meet the Positive Constant -- 7.3 Upper Bound for $\text{Card}(E)$ -- We Meet the Positive Constant K -- 7.4 Theorem 7.11 -- 7.5 Near Reflections -- 7.6 Tensors, Wedge Product, and Tensor Product -- 8 Algebraic Geometry: Approximation-varieties, Lojasiewicz, Quantification: (ϵ, δ) -Theorem 2.2 (part (2)) -- 8.1 Min-max Optimization and Approximation-varieties -- 8.2 Min-max Optimization and Convexity -- 9 Building ϵ -distortions: Near Reflections -- 9.1 Theorem 9.14 -- 9.2 Proof of Theorem 9.14 -- 10 ϵ -distorted diffeomorphisms, $O(d)$ and Functions of Bounded Mean Oscillation (BMO) -- 10.1 BMO -- 10.2 The John-Nirenberg Inequality -- 10.3 Main Results -- 10.4 Proof of Theorem 10.17 -- 10.5 Proof of Theorem 10.18 -- 10.6 Proof of Theorem 10.19 -- 10.7 An Overdetermined System -- 10.8 Proof of Theorem 10.16 -- 11 Results: A Revisit of Theorem 2.2 (part (1)) -- 11.1 Theorem 11.21 -- 11.2 blocks -- 11.3 Finiteness Principle -- 12 Proofs: Gluing and Whitney Machinery -- 12.1 Theorem 11.23 -- 12.2 The Gluing Theorem -- 12.3 Hierarchical Clusterings of Finite Subsets of \mathbb{R}^d Revisited -- 12.4 Proofs of Theorem 11.27 and Theorem 11.28 -- 12.5 Proofs of Theorem 11.31, Theorem 11.30 and Theorem 11.29 -- 13 Extensions of Smooth Small Distortions [41]: Introduction -- 13.1 Class of Sets E -- 13.2 Main Result -- 14 Extensions of Smooth Small Distortions: First Results -- Lemma 14.1 -- Lemma 14.2 -- Lemma 14.3 -- Lemma 14.4 -- Lemma 14.5 -- 15 Extensions of Smooth Small Distortions: Cubes, Partitions of Unity, Whitney Machinery -- 15.1 Cubes -- 15.2 Partition of Unity -- 15.3 Regularized Distance. 16 Extensions of Smooth Small Distortions: Picking Motions -- Lemma 16.1 -- Lemma 16.2 -- 17 Extensions of Smooth Small Distortions: Unity Partitions -- 18 Extensions of Smooth Small Distortions: Function Extension -- Lemma 18.1 -- Lemma 18.2 -- 19 Equidistribution: Extremal Newtonian-like Configurations, Group Invariant Discrepancy, Finite Fields, Combinatorial Designs, Linear Independent Vectors, Matroids and the Maximum Distance Separable Conjecture -- 19.1 s -extremal Configurations and Newtonian s -energy -- 19.2 $[1, 1]$ -- 19.2.1 Critical Transition -- 19.2.2 Distribution of s -extremal Configurations -- 19.2.3 Equally Spaced Points for Interpolation -- 19.3 The n -dimensional Sphere, S_n Embedded in \mathbb{R}^{n+1} -- 19.3.1 Critical Transition -- 19.4 Torus -- 19.5 Separation Radius and Mesh Norm for s -extremal Configurations -- 19.5.1 Separation Radius of s -- n -extremal Configurations on a Set Y_n -- 19.5.2 Separation Radius of s -- $n-1$ -extremal Configurations on S_n -- 19.5.3 Mesh Norm of s -extremal Configurations on a Set Y_n -- 19.6 Discrepancy of Measures, Group Invariance -- 19.7 Finite Field Algorithm -- 19.7.1

Examples -- 19.7.2 Spherical t-designs -- 19.7.3 Extension to Finite Fields of Odd Prime Powers -- 19.8 Combinatorial Designs, Linearly Independent Vectors, MDS Conjecture -- 19.8.1 The Case $q=2$ -- 19.8.2 The General Case -- 19.8.3 The Maximum Distance Separable Conjecture -- 20 Covering of $SU(2)$ and Quantum Lattices -- 20.1 Structure of $SU(2)$ -- 20.2 Universal Sets -- 20.3 Covering Exponent -- 20.4 An Efficient Universal Set in $PSU(2)$ -- 21 The Unlabeled Correspondence Configuration Problem and Optimal Transport -- 21.1 Unlabeled Correspondence Configuration Problem -- 21.1.1 Non-reconstructible Configurations -- 21.1.2 Example -- 21.1.3 Partition Into Polygons -- 21.1.4 Considering Areas of Triangles-10-step Algorithm. 21.1.5 Graph Point of View -- 21.1.6 Considering Areas of Quadrilaterals -- 21.1.7 Partition Into Polygons for Small Distorted Pairwise Distances -- 21.1.8 Areas of Triangles for Small Distorted Pairwise Distances -- 21.1.9 Considering Areas of Triangles (part 2) -- 21.1.10 Areas of Quadrilaterals for Small Distorted Pairwise Distances -- 21.1.11 Considering Areas of Quadrilaterals (part 2) -- 22 A Short Section on Optimal Transport -- 23 Conclusion -- References -- Index -- EULA.
