



The disc embedding theorem

/

Behrens, Stefan,
author

Instructional and educational works.

Monografía

This text contains the first thorough and approachable exposition of Freedman's proof of the disc embedding theorem

<https://rebiunoda.pro.baratznet.cloud:28443/OpacDiscovery/public/catalog/detail/b2FpOmNlbgVlcmF0aW9uOmVzLmJhemF0ei5yZW4vMzY0MzMO0Tc>

Título: The disc embedding theorem editors, Stefan Behrens [et al.]

Edición: First edition

Editorial: Oxford, UK Oxford University Press [2021] 2021

Descripción física: 1 online resource (xvii, 473 pages) illustrations (black and white, and colour)

Mención de serie: Oxford scholarship online

Nota general: This edition also issued in print: 2021

Bibliografía: Includes bibliographical references and index

Contenido: Cover -- The Disc Embedding Theorem -- Copyright -- Preface -- The Origin of This Book -- Casson Towers -- Differences -- Seminar Organization -- Credit -- Contents -- List of Figures -- 1: Context for the Disc Embedding Theorem -- 1.1 Before the Disc Embedding Theorem -- 1.1.1 High-dimensional Surgery Theory -- 1.1.2 Attempting 4-dimensional Surgery -- 1.1.3 Attempting to Prove the s-cobordism Theorem -- 1.2 The Whitney Move in Dimension Four -- 1.3 Casson's Insight: Geometric Duals -- 1.3.1 Surgery and Geometric Duals -- 1.3.2 The s-cobordism Theorem and Geometric Duals -- 1.4 Casson Handles -- 1.5 The Disc Embedding Theorem -- 1.6 After the Disc Embedding Theorem -- 1.6.1 Foundational Results -- 1.6.2 Classification Results -- 1.6.3 Knot Theory Results -- 2: Outline of the Upcoming Proof -- 2.1 Preparation -- 2.2 Building Skyscrapers -- 2.3 Skyscrapers Are Standard -- 2.4 Reader's Guide -- Part I: Decomposition Space Theory -- 3: The Schoenflies Theorem after Mazur, Morse, and Brown -- 3.1 Mazur's Theorem -- 3.2 Morse's Theorem -- 3.3 Shrinking Cellular Sets -- 3.4 Brown's Proof of the Schoenflies Theorem -- 4: Decomposition Space Theory and the Bing Shrinking Criterion -- 4.1 The Bing Shrinking Criterion -- 4.2 Decompositions -- 4.3 Upper Semi-continuous Decompositions -- 4.4 Shrinkability of Decompositions -- 5: The Alexander Gored Ball and the Bing Decomposition -- 5.1 Three Descriptions of the Alexander Gored Ball -- 5.1.1 An Intersection of 3-balls in D^3 -- 5.1.2 A (3-dimensional) Grope -- 5.1.3 A Decomposition Space -- 5.2 The Bing Decomposition: The First Ever Shrink -- 6: A Decomposition That Does Not Shrink -- 7: The Whitehead Decomposition -- 7.1 The Whitehead Decomposition Does Not Shrink -- 7.2 The Space S^3/W Is a Manifold Factor -- 8: Mixed Bing-Whitehead Decompositions -- 8.1 Toroidal Decompositions

8.2 Disc Replicating Functions -- 8.3 Shrinking of Toroidal Decompositions -- 8.4 Computing the Disc Replicating Function -- 9: Shrinking Starlike Sets -- 9.1 Null Collections and Starlike Sets -- 9.2 Shrinking Null, Recursively Starlike-equivalent Decompositions -- 9.3 Literature Review -- 10: The Ball to Ball Theorem -- 10.1 The Main Idea of the Proof -- 10.2 Relations -- 10.3 Admissible Diagrams and the Main Lemma -- 10.4 Proof of the Ball to Ball Theorem -- 10.5 The General Position Lemma -- 10.6 The Sphere to Sphere Theorem from the Ball to Ball Theorem -- Part II: Building Skyscrapers -- 11: Intersection Numbers and the Statement of the Disc Embedding Theorem -- 11.1 Immersions -- 11.2 Whitney Moves and Finger Moves -- 11.2.1 Whitney Moves -- 11.2.2 Finger Moves -- 11.3 Intersection and Self-intersection Numbers -- 11.4 Statement of the Disc Embedding Theorem -- 12: Grotes, Towers, and Skyscrapers -- 12.1 Grotes and Towers -- 12.2 Infinite Towers and Skyscrapers -- 13: Picture Camp -- 13.1 Dehn Surgery -- 13.2 Kirby Diagrams -- 13.2.1 Attaching 1-handles -- 13.2.2 Attaching 2-handles -- 13.2.3 Attaching and Tip Regions -- 13.3 Kirby Calculus -- 13.3.1 Handle Slides -- 13.3.2 Handle Cancellation -- 13.3.3 Plumbing -- 13.4 Kirby Diagrams for Generalized Towers -- 13.4.1 Surface Blocks -- 13.4.2 Disc and Cap Blocks -- 13.4.3 Stages -- 13.4.4 Generalized Towers -- 13.5 Bing and Whitehead Doubling -- 13.6 Simplification -- 13.6.1 Bing Doubles -- 13.6.2 Whitehead Doubles -- 13.6.3 Trees Associated with Generalized Towers -- 13.6.4 Kirby Diagrams from Trees -- 13.7 Chapter Summary -- 14: Architecture of Infinite Towers and Skyscrapers -- 14.1 Infinite Towers -- 14.2 Infinite Compactified Towers -- 14.3 Skyscrapers -- 15: Basic Geometric Constructions -- 15.1 The Clifford Torus -- 15.2 Elementary Geometric Techniques -- 15.2.1 Tubing -- 15.2.2 Boundary Twisting -- 15.2.3 Making Whitney Circles Disjoint -- 15.2.4 Pushing Down Intersections -- 15.2.5 Contraction and Subsequent Pushing Off -- 15.3 Replacing Algebraic Duals with Geometric Duals -- 16: From Immersed Discs to Capped Grotes -- 17: Grope Height Raising and 1-storey Capped Towers -- 17.1 Grope Height Raising -- 17.2 1-storey Capped Towers -- 17.3 Continuation of the Proof of the Disc Embedding Theorem -- 18: Tower Height Raising and Embedding -- 18.1 The Tower Building Permit -- 18.2 The Tower Squeezing Lemma -- 18.3 The Tower and Skyscraper Embedding Theorems -- 18.4 Proof of the Disc Embedding Theorem, Assuming Part IV -- Part III: Interlude -- 19: Good Groups -- 20: The s-cobordism Theorem, the Sphere Embedding Theorem, and the Poincaré Conjecture -- 20.1 The s-cobordism Theorem -- 20.2 The Poincaré Conjecture -- 20.3 The Sphere Embedding Theorem -- 21: The Development of Topological 4-manifold Theory -- 21.1 Results Proven in This Book -- 21.2 Input to the Flowchart -- 21.2.1 Immersion Theory and Smoothing Noncompact, Contractible 4-manifolds -- 21.2.2 Donaldson Theory -- 21.3 Further Results from Freedman's Original Paper -- 21.3.1 The Proper h-cobordism Theorem with Smooth Input -- 21.3.2 Integral Homology 3-spheres Bound Contractible 4-manifolds -- 21.4 Foundational Results Due to Quinn -- 21.4.1 The Controlled h-cobordism Theorem with Smooth Input -- 21.4.2 Handle Straightening -- 21.4.3 The Stable Homeomorphism Theorem -- 21.4.4 The Annulus Theorem and Connected Sum -- 21.4.5 The Sum Stable Smoothing Theorem -- 21.4.6 $TOP(4)=O(4)!$ $TOP=O$ is 5-connected -- 21.4.7 Smoothing Away from a Point -- 21.4.8 Normal Bundles -- 21.4.9 Topological Transversality and Map Transversality -- 21.4.10 The Immersion Lemma -- 21.4.11 Handle Decompositions of 5-manifolds -- 21.5 Category Preserving Theorems -- 21.5.1 The Surgery Sequence for Good Groups -- 21.6 Flagship Results -- 21.6.1 Classification of Closed, Simply Connected 4-manifolds -- 21.6.2 The Poincaré Conjecture with Topological Input -- 21.6.3 Alexander Polynomial One Knots Are Slice -- 21.6.4 Slice Knots -- 21.6.5 Exotic R_4 s -- 21.6.6 Computation of the 4-dimensional Bordism Group -- 22: Surgery Theory and the Classification of Closed, Simply Connected 4-manifolds -- 22.1 The Surgery Sequence -- 22.1.1 Normal Maps -- 22.1.2 L-groups -- 22.1.3 The Surgery Obstruction Map -- 22.1.4 Exactness at the Normal Maps -- 22.1.5 Wall Realization -- 22.1.6 Exactness at the Structure Set -- 22.2 The Surgery Sequence for Manifolds with Boundary -- 22.3 Classification of Closed, Simply Connected 4-manifolds -- 22.3.1 Existence of a 4-manifold -- 22.3.2 Size of the Structure Set -- 22.3.3 Realizing Isometries by Homeomorphisms -- 22.3.4 Other Homeomorphism Classifications of 4-manifolds -- 23: Open Problems -- 23.1 The Disc Embedding Conjecture -- 23.1.1 Standard Slices for Universal Links -- 23.2 The Surgery Conjecture -- 23.2.1 Good Boundary Links -- 23.2.2 Free Slice Discs and the Link Family L_1 -- 23.2.3 Free Slice Discs and the Link Family L_2 -- 23.2.4 The A-B Slice Problem -- 23.3 The s-cobordism Conjecture -- 23.3.1 Round Handles -- Part IV: Skyscrapers Are Standard -- 24: Replicable Rooms and Boundary Shrinkable Skyscrapers -- 25: The Collar Adding Lemma -- 26: Key Facts about Skyscrapers and Decomposition Space Theory -- 26.1 Ingredients from Part I -- 26.2 Ingredients from Part II -- 27: Skyscrapers Are Standard: An Overview -- 27.1 An Outline of the Strategy -- 27.2 The Strategy in More Detail -- 27.3 Some Things to Keep in Mind -- 28: Skyscrapers Are Standard: The Details -- 28.1 Binary Words and the Cantor Set -- 28.2 The Standard Handle -- 28.3 Embedding the Design in a Skyscraper -- 28.3.1 The Design Piece for the Empty Word -- 28.3.2 Design Pieces for Finite Binary Words -- 28.3.3 Design Pieces for Infinite Binary Words -- 28.4 Embedding the

Design in the Standard Handle -- 28.4.1 Embedding Finite Word Design Pieces in H -- 28.4.2 Embedding Infinite Word Design Pieces in H -- 28.5 From Holes and Gaps to Holes+ and Gaps+ -- 28.6 Shrinking the Complement of the Design -- 28.6.1 The Common Quotient -- 28.6.2 The Map Is Approximable by Homeomorphisms -- 28.6.3 The Map Is Approximable by Homeomorphisms -- Afterword: PC4 at Age 40 -- References -- Index

Audiencia: Specialized

ISBN: 0-19-187692-5 0-19-257838-3

Materia: Differential topology Mathematics- Study and teaching

Autores: Behrens, Stefan, author

Enlace a formato fisico adicional: 0-19-884131-0

Punto acceso adicional serie-Título: Oxford scholarship online

Baratz Innovación Documental

- Gran Vía, 59 28013 Madrid
- (+34) 91 456 03 60
- informa@baratz.es