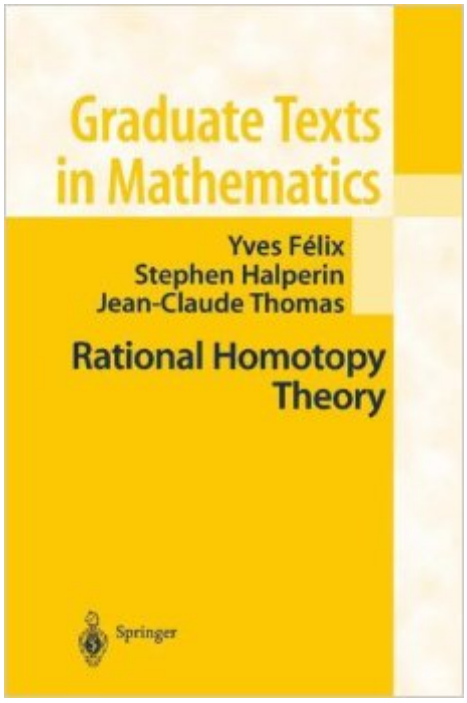
Rational Homotopy Theory (Graduate Texts In Mathematics)



Synopsis

Rational homotopy theory is a subfield of algebraic topology. Written by three authorities in the field, this book contains all the main theorems of the field with complete proofs. As both notation and techniques of rational homotopy theory have been considerably simplified, the book presents modern elementary proofs for many results that were proven ten or fifteen years ago.

Book Information

Series: Graduate Texts in Mathematics (Book 205)

Hardcover: 539 pages

Publisher: Springer; 2001 edition (December 21, 2000)

Language: English

ISBN-10: 0387950680

ISBN-13: 978-0387950686

Product Dimensions: 6.1 x 1.4 x 9.2 inches

Shipping Weight: 2.2 pounds (View shipping rates and policies)

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Customer Reviews

This book follows up and greatly extends the work of the topologist Dennis Sullivan on the rationalization of topological spaces and continuous maps between these rationalizations. For n greater than or equal to 2, both the nth-homotopy group the nth homology group are abelian, and this lead Sullivan to introduce the concept of a "rationalized space". For such a space, one studies its nth homology group over the rational numbers, and the nth homotopy group of a rationalized space is the tensor product of the nth homotopy group with the rational numbers. Information of course is lost in such an approach, but it has the advantage of being amenable to calculation. The authors give a detailed overview of just what can be done for rationalized spaces and they do an excellent job of presenting it to those who are not experts in the theory. The book can definitely be read by graduate students who have finished courses in algebraic and geometric topology, and professional mathematicians who have some background in topology and who are curious about the subject. As the authors explain eloquently, the (computational) power of rational homotopy

theory comes from its algebraic formulation, which was first discussed by Sullivan and the mathematician Daniel Quillen, and involves the use of graded objects with both an algebraic structure and a "differential". What is fascinating about the role of the differential is its connection with homotopy theory, and not just in homology and cohomology theory as encountered in first-year graduate courses in algebraic topology. The authors deal with three different graded categories with a differential in the book, namely modules over a differential graded algebra (R, d), commutative cochain algebras, and differential graded Lie algebras.