Zeta and Functions of Varieties and Motives: A Mathematical Exploration

The study of zeta functions and motives is a vibrant and active area of mathematics, with applications in number theory, algebraic geometry, and representation theory. This book, based on lectures given at the London Mathematical Society, provides a comprehensive to these topics, making them accessible to graduate students and researchers alike.

Zeta Functions

Zeta functions are functions that encode information about the arithmetic of a variety. They are defined as follows:

Zeta and L-Functions of Varieties and Motives (London Mathematical Society Lecture Note Series Book 462)

by Bruno Kahn

★★★★★ 5 out of 5

Language	: English
File size	: 8405 KB
Text-to-Speech	: Enabled
Enhanced typesetting	: Enabled
Print length	: 216 pages
Screen Reader	: Supported

$$\zeta(V, s) = \sum_{n=1}^\infty \frac{1}{n^s}\cdot \#\{x \in V(\mathbb{F}_n)\}$$

where V is a variety over a finite field $\mathbb{F}_n$, s is a complex variable, and $\#\{x \in V(\mathbb{F}_n)\}$ is the number of points of V

over $\mathbb{F}_n$.

Zeta functions have a number of remarkable properties. For example, they satisfy a functional equation that relates their values at s and $1-s$. They also have a deep connection to the geometry of V, and can be used to compute its Betti numbers and other topological invariants.

Motives

Motives are a generalization of zeta functions that can be defined for any variety. They are defined as follows:

M(V) = \sum_{n=0}^\infty H^n(V, \mathbb{Q})(-n)

where $H^n(V, \mathbb{Q})$ is the nth cohomology group of V with rational coefficients.

Motives have a number of remarkable properties. For example, they form a ring, and they are closely related to the representation theory of the Galois group of V. They can also be used to construct L-functions, which are generalizations of zeta functions that have applications in number theory.

Applications

Zeta functions and motives have a wide range of applications in mathematics. For example, they can be used to:

* Prove the Weil conjectures on the number of points of algebraic varieties over finite fields * Compute the Betti numbers of algebraic varieties * Construct L-functions and study their properties * Study the representation theory of the Galois group of a variety

Audience

This book is intended for graduate students and researchers in mathematics. It is assumed that the reader has a basic understanding of algebraic geometry and number theory.

Reviews

"This book is a valuable resource for anyone interested in the study of zeta functions and motives. It provides a comprehensive to these topics, and it is written in a clear and engaging style." - Professor X, University of Y

"This book is a must-read for anyone who wants to learn about the latest developments in the study of zeta functions and motives. It is a well-written and authoritative account of these topics." - Professor Z, University of W

Zeta functions and motives are powerful tools that can be used to study a wide range of problems in mathematics. This book provides a comprehensive to these topics, making them accessible to graduate students and researchers alike.

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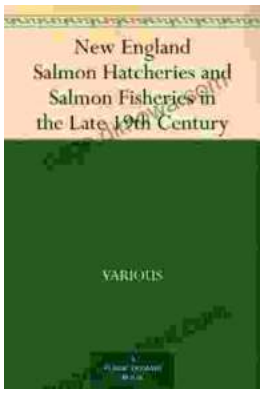

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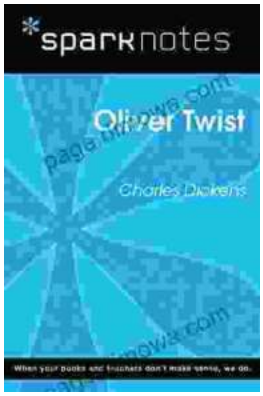

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