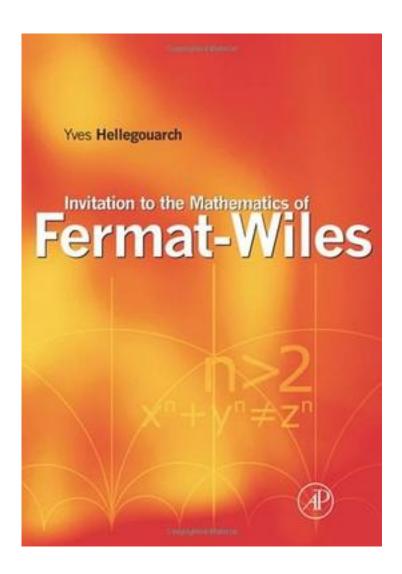
## An Invitation to the Mathematics of Fermat-Wiles



An Invitation to the Mathematics of Fermat-Wiles\_下载链接1\_

著者:Hellegouarch, Yves

出版者:Academic Press

出版时间:2001-10

装帧:HRD

isbn:9780123392510

Assuming only modest knowledge of undergraduate level math, "Invitation to the

Mathematics of Fermat-Wiles" presents diverse concepts required to comprehend Wiles' extraordinary proof. Furthermore, it places these concepts in their historical context. This book can be used in introduction to mathematics theories courses and in special topics courses on Fermat's last theorem. It contains themes suitable for development by students as an introduction to personal research as well as numerous exercises and problems. However, the book will also appeal to the inquiring and mathematically informed reader intrigued by the unraveling of this fascinating puzzle. It rigorously presents the concepts required to understand Wiles' proof, assuming only modest undergraduate level math. It sets the math in its historical context. It contains several themes that could be further developed by student research and numerous exercises and problems. It is written by Yves Hellegouarch, who himself made an important contribution to the proof of Fermat's last theorem.

## 作者介绍:

Yves Hellegouarch studied at the École Normale Supérieure in Paris. He has been teaching at the University of Caen since 1970. In 1972 he wrote a thesis, "Elliptic Curves and Fermat's Equation.'

目录: 1 Paths

- 1.1 Diophantus and his Arithmetica
- 1.2 Translations of Diophantus
- 1.3 Fermat
- 1.4 Infinite Descent
- 1.5 Fermat's "Theorem" in Degree 4
- 1.6 The Theorem of Two Squares
- 1.6.1 A Modern Proof
- 1.6.2 "Fermat-Style" Proof of the Crucial Theorem
- 1.6.3 Representations as Sums of Two Squares
- 1.7 Euler-Style Proof of Fermat's Last Theorem for n=3
- 1.8 Kummer, 1847
- 1.8.1 The Ring of Integers of  $Q(\xi)$
- 1.8.2 A Lemma of Kummer on the Units of Z[\xi|
- 1.8.3 The Ideals of Ζ[ξ] 1.8.4 Kummer's Proof (1847)
- 1.8.5 Regular Primes
- 1.9 The Current Approach
- Exercises and Problems
- 2 Elliptic Functions
- 2.1 Elliptic Integrals
- 2.2 The Discovery of Elliptic Functions in 1718
- 2.3 Euler's Contribution (1753)
- 2.4 Elliptic Functions: Structure Theorems
- 2.5 Weierstrass-Style Elliptic Functions
- 2.6 Eisenstein Series
- 2.7 The Weierstrass Cubic
- 2.8 Abel's Theorem
- 2.9 Loxodromic Functions
- 2.10 The Function p
- 2.11 Computation of the Discriminant
- 2.12 Relation to Elliptic Functions
- Exercises and Problems

3 Numbers and groups 3.1 Absolute Values on Q 3.2 Completion of a Fequipped with an Absolute Value 3.3 The Field of p-adic Numbers 3.4 Algebraic Closure of a Field 3.5 Generalities on the Linear Representations of Groups 3.6 Galois Extensions 3.6.1 The Galois Correspondence 3.6.2 Questions of Dimension 3.6.3 Stability 3.6.4 Conclusions 3.7 Resolution of Algebraic Equations 3.7.1 Some General Principles 3.7.2 Resolution of the Equation of Degree Three Exercises and Problems 4 Elliptic Curves 4.1 Cubics and Elliptic Curves 4.2 B'ezout's Theorem 4.3 Nine-Point Theorem 4.4 Group Laws on an Elliptic Curve 4.5 Reduction Modulo p 4.6 N-Division Points of an Elliptic Curve 4.6.1 2-Division Points 4.6.2 3-Division Points 4.6.3 n-Division Points of an Elliptic Curve Defined Over Q 4.7 A Most Interesting Galois Representation 4.8 Ring of Endomorphisms of an Elliptic Curve 4.9 Elliptic Curves Over a Finite Field 4.10 Torsion on an Elliptic Curve Defined Over Q 4.11 Mordell-Weil Theorem 4.12 Back to the Definition of Elliptic Curves 4.13 Formulae 4.14 Minimal Weierstrass Equations (Over Z) 4.15 Hasse-Weil L-Function's 4.15.1 Riemann Zeta Function 4.15.2 Artin Zeta Function 4.15.3 Hasse-Weil L-Function Exercises and Problems 5 Modular Forms 5.1 Brief Historical Overview 5.2 The Theta Functions 5.3 Modular Forms for the Modular Group SL2(Z)/{I,-I} 5.3.1 Modular Properties of the Eisenstein Series 5.3.2 The Modular Group 5.3.3 Definition of Modular Forms and Functions 5.4 The Space of Modular Forms of Weight k for SL2(Z) 5.5 The Fifth Operation of Arithmetic 5.6 The Petersson Hermitian Product 5.7 Hecke Forms 5.7.1 Hecke Operators for SL2(Z) 5.8 Hecke's Theory 5.8.1 The Mellin Transform 5.8.2 Functional Equations for the Functions L(f,s)

5.9 Wiles' Theorem

Exercises and Problems	
6 New Paradigms, New Enigmas 6.1 A Second Definition of the Ring Zp of p-adic Integers	
6.2 The Tate Module TI(E)	
6.3 A Marvellous Result	
6.4 Tate Loxodromic Functions	
6.5 Curves EA,B,C	
6.5.1 Reduction of Certain Curves EA,B,C	
6.5.2 Property of the Field Kp Associated to Eap,bp,cp	
6.5.3 Summary of the Properties of Eap,bp,cp 6.6 The Serre Conjectures	
6.7 Mazur–Ribet's Theorem	
6.7.1 Mazur-Ribet's Theorem	
6.7.2 Other Applications	
6.8 Szpiro's Conjecture and the abc Conjecture	
6.8.1 Szpiro's Conjecture	
6.8.2 abc Conjecture	
6.8.3 Consequences	
Exercises and Problems  Appendix The Origin of the Elliptic Approach to Format'	a Last Theorem
Appendix: The Origin of the Elliptic Approach to Fermat'······(收起)	S Last THEORETT

An Invitation to the Mathematics of Fermat-Wiles\_下载链接1\_

## 标签

数学

Fermat-Wiles

计算机科学

to

The

Of

Mathematics

Math

-	Ľ	7	_	'n	亼
	Г		ļ		L

-----

An Invitation to the Mathematics of Fermat-Wiles\_下载链接1\_

书评

-----

An Invitation to the Mathematics of Fermat-Wiles\_下载链接1\_