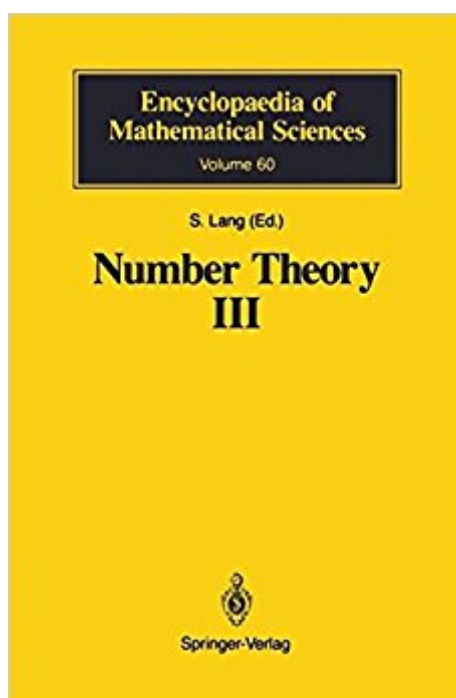


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# Number Theory III: Diophantine Geometry (Encyclopaedia Of Mathematical Sciences) (v. 3)



## Synopsis

In 1988 Shafarevich asked me to write a volume for the Encyclopaedia of Mathematical Sciences on Diophantine Geometry. I said yes, and here is the volume. By definition, diophantine problems concern the solutions of equations in integers, or rational numbers, or various generalizations, such as finitely generated rings over  $\mathbb{Z}$  or finitely generated fields over  $\mathbb{Q}$ . The word Geometry is tacked on to suggest geometric methods. This means that the present volume is not elementary. For a survey of some basic problems with a much more elementary approach, see [La 90c]. The field of diophantine geometry is now moving quite rapidly. Outstanding conjectures ranging from decades back are being proved. I have tried to give the book some sort of coherence and permanence by emphasizing structural conjectures as much as results, so that one has a clear picture of the field. On the whole, I omit proofs, according to the boundary conditions of the encyclopedia. On some occasions I do give some ideas for the proofs when these are especially important. In any case, a lengthy bibliography refers to papers and books where proofs may be found. I have also followed Shafarevich's suggestion to give examples, and I have especially chosen these examples which show how some classical problems do or do not get solved by contemporary insights. Fermat's last theorem occupies an intermediate position. Although it is not proved, it is not an isolated problem any more.

## Book Information

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## Customer Reviews

From the reviews of the first printing of this book, published as Volume 60 of the Encyclopaedia of Mathematical Sciences: "Between number theory and geometry there have been several stimulating influences, and this book records of these enterprises. This author, who has been at the centre of such research for many years, is one of the best guides a reader can hope for. The book is full of beautiful results, open questions, stimulating conjectures and suggestions where to look for future developments. This volume bears witness of the broad scope of knowledge of the author, and the influence of several people who have commented on the manuscript before publication ... Although in the series of number theory, this volume is on diophantine geometry, and the reader will notice that algebraic geometry is present in every chapter. ... The style of the book is clear. Ideas are well explained, and the author helps the reader to pass by several technicalities. Reading and rereading this book I noticed that the topics are treated in a nice, coherent way, however not in a historically logical order. ... The author writes "At the moment of writing, the situation is in flux...". That is clear from the scope of this book. In the area described many conjectures, important results, new developments took place in the last 30 years. And still new results come at a breathtaking speed in this rich field. In the introduction the author notices: "I have included several connections of diophantine geometry with other parts of mathematics, such as PDE and Laplacians, complex analysis, and differential geometry. A grand unification is going on, with multiple connections between these fields." Such a unification becomes clear in this beautiful book, which we recommend for mathematicians of all disciplines." Medelingen van het wiskundig genootschap, 1994 "... It is fascinating to see how geometry, arithmetic and complex analysis grow together!..." Monatshefte für Mathematik, 1993

From the reviews: "Between number theory and geometry there have been several stimulating influences, and this book records these enterprises. This author, who has been at the centre of such research for many years, is one of the best guides a reader can hope for. The book is full of beautiful results, open questions, stimulating conjectures and suggestions where to look for future developments. This volume bears witness of the broad scope of knowledge of the author, and the influence of several people who have commented on the manuscript before publication... Although in the series of number theory, this volume is on diophantine geometry, the reader will notice that algebraic geometry is present in every chapter. ... The style of the book is clear. Ideas are well explained, and the author helps the reader to pass by several technicalities. Mededelingen van het wiskundig genootschap

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