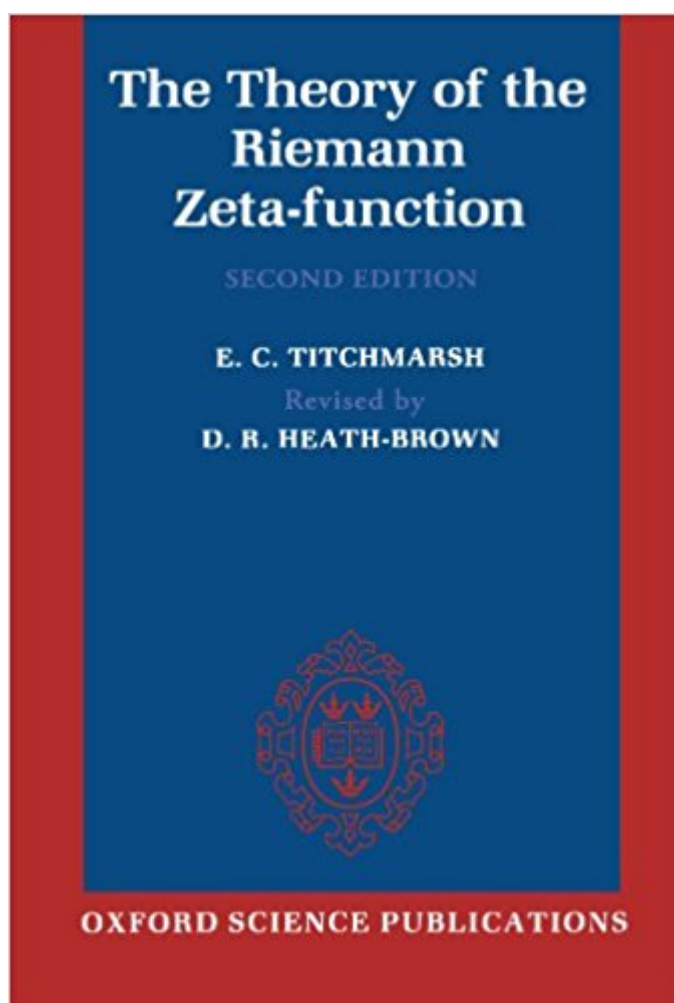


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# The Theory Of The Riemann Zeta-Function (Oxford Science Publications)



## Synopsis

The Riemann zeta-function embodies both additive and multiplicative structures in a single function, making it our most important tool in the study of prime numbers. This volume studies all aspects of the theory, starting from first principles and probing the function's own challenging theory, with the famous and still unsolved "Riemann hypothesis" at its heart. The second edition has been revised to include descriptions of work done in the last forty years and is updated with many additional references; it will provide stimulating reading for postgraduates and workers in analytic number theory and classical analysis.

## Book Information

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## Customer Reviews

"The first edition of this classical treatise appeared in 1951 . . . Besides writing the updating and elucidating notes, covering all in all over 50 pages, the editor also has compiled a list of some 120 additional references to the more recent literature on the zeta-function. Thanks to the ample new material, this new edition makes very interesting reading, even for those who are familiar with the original." --Mathematical Reviews  
"Despite its age this is probably the most-cited book on the zeta function... The book is very comprehensive, and covers nearly anything anyone would want to know about the zeta function." -- MAA Reviews  
"A reprinting of this classic treatise with corrections and extensive end-of-chapter notes by D.R. Heath-Brown." --The American Mathematical Monthly

The late E. C. Titchmarsh was at University of Oxford. D. R. Heath-Brown is at Magdalen College,

Oxford.

A pricey text but it remains the most comprehensive reference for basic theory of the Zeta-Function. This is evidenced by the fact that it is referenced by such texts as Ivic and even Iwaniec and Kowalski for many of the more involved classical results. The more elementary and introductory Edwards text refers to Titchmarsh when the deeper complex variable methods are needed. Titchmarsh assumes the reader is skilled in complex variable theory at the level of his text "The Theory of Functions" and also assumes you know the product expansion of the Zeta-Function in terms of the primes (1st page!-can be found in Hardy-Wright or online, involves geometric series') Hardy's Theorem on the zeroes of Zeta on the critical line is proven in this text and this is referenced or the original paper for proof in the other texts. In fairness none of these texts give the complete proof of Levinson's Theorem-they all use Selberg's method if at all which gives a weaker result. Complete proofs of these theorems can be found on line. Despite advances in L-functions, excursions into elliptic curves and some beautiful work by Deligne progress beyond Levinson in settling the Riemann Hypothesis has effectively stalled. The classical results still are among the best and the methods may yet inspire further developments. The mathematician/physicist Michel Lapidus has made conjectures on the fractal nature of the zero set via the functional equations and their iterations-this might be of interest.

I've read meticulously the chapters in this book on the functional equation of the zeta function, the prime number theorem, the approximate functional equation, the order of the zeta function in the critical strip, and the Dirichlet divisor problem (which can be expressed as a question about the square of the zeta function), and also a sprinkling of material from some of the other chapters. This is not a bad book to learn from, but the author's ways of speaking are not always modern. I think that a reader who wants to learn the analytic theory of the zeta function would do better to read Ivic's "The Riemann Zeta-Function: Theory and Applications" or Edwards' "Riemann's Zeta Function". Edwards' book does not have as much material as either Ivic or Titchmarsh but it presents the material in a historical setting. Both Ivic's book and Edwards' book are published by Dover and thus are quite cheap. For a really modern presentation of the analytic theory of the Riemann zeta function (and other L-functions, both L-functions for Dirichlet characters and for modular forms), dip into Iwaniec and Kowalski's "Analytic Number Theory". For example, Iwaniec and Kowalski prove an approximate functional equation for general L-functions that uses smoothing functions, which is not a technique that Titchmarsh uses.

Titchmarsh is well known in the theory of functions, in this book, he described the Riemann's Zeta function in the most comprehensive way. ( e. g. in the topic of functional equation, he quoted 7 methods) I cannot find any other book more comprehensive than this one. ( though in order the theories, you must have some background knowledge and patience ! )

This book by far has to be the most concise collection of all of the materials that exist today on the Riemann Zeta function

The bible of zeta!

This is the true encyclopaedia of the zeta function. Although I prefer Ivic, I always have the feeling that Titchmarsh wants to appear brilliant. This book cannot be criticized because of the amount of time and effort that must have been spent on it. It was update in 1986 by Heath Brown. It is useless to summarize the contents because it mainly has everything, and most theorems have several proofs and very long comments. One thing that is missing is more stuff about prime number distributions (for this, check Ingham, Edward's, and a bit of Ivic's). It never becomes redundant, and it can either be used a source for additional information, as dictionary, or it can be used in a linear way.

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