

Book Presentation: “Arithmetic Functions”

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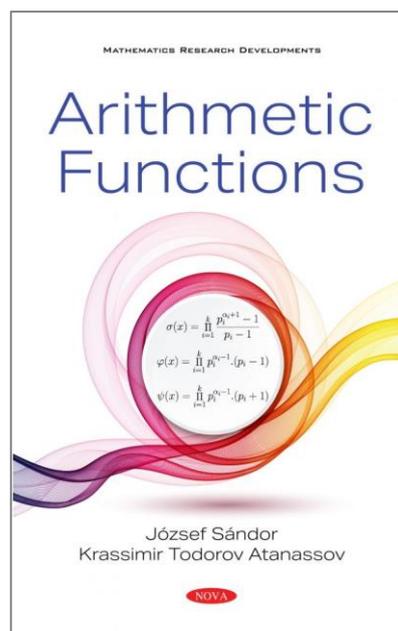
Arithmetic Functions

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In the mid-1980s, the research paths of the two authors were running in parallel: Krassimir Atanassov, born in Bulgaria in 1954, published his first papers on number theory in the “Bulletin of Number Theory and Related Topics” in 1984, while József Sándor, born in Romania in 1956, published his ones a year later. In 1987, Sándor contacted Atanassov to inquire about his current areas of research, because several times by then Sándor had submitted results to the “Bulletin” only to receive a response that similar findings by Atanassov were already in press. In the years to come, the situation turned around, and Atanassov started seeing in the “Bulletin” results he was going to submit already published by Sándor. Thus, both authors came to the idea to join forces and write a common paper*. It was followed by other papers, and thus in 2008 the idea about the present book was born. It took us many years of active email correspondence to unify, at least partially, our styles of exposition and the notations used in our individual papers. Although we, together with Prof. Anthony G. Shannon (Australia), are the Editors of the international journal “Notes on Number Theory and Discrete Mathematics” already 26 years, and we live just 600-700 kilometres apart, we have not met yet. But we hope this will happen one day, as well.



This, in short, is the story of the present book, and we hope that you will find reading it as interesting as we found writing it. The aim of this book is to present some new results of the authors in the theory of arithmetic functions. Arithmetic functions are very important in many parts of theoretical and applied sciences, and many mathematicians have devoted great interest in this field. For example, the classical Euler totient function, and some other related functions appears almost in all major domains of mathematics or its applications. The famous Riemann hypothesis, which is one of the most difficult unsolved problems of our time, can be stated as an inequality in terms of the sum-of-divisors function. One of the main aims of the authors is to

* Atanassov, K., & Sándor, J. (1989). On some modifications of φ and σ functions. *Comptes Rendus de l'Academie bulgare des Sciences*, 42(1), 55–58.

study some interesting new properties of these classical arithmetic functions. Many relations are proved, especially inequalities connected with these functions.

Besides the above two arithmetic functions, some functions appear naturally as the number of divisors of a number, the distinct or total number of prime divisors of a number, Dedekind's arithmetic function, the prime counting function, the core function, and many other classical functions. Also, famous numbers related to such functions are studied, such as perfect numbers and their variations, which actually contain many unsolved and difficult problems. One of the interesting features of the book is the introduction and study of certain new arithmetic functions. These new functions have been considered by the authors separately or together, and their importance is shown in many connections with the classical arithmetic functions or in their applications to other problems.

This book may be of interest to students, researchers, teachers and professors working in number theory and related fields as well as to anyone who discovers connections with algebra, mathematical analysis, or other domains. It can be used in seminars or in formulation of new problems on arithmetic functions and their various applications. Also, it could become the starting point for new research on the themes introduced in these chapters.

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