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Special Issue Reprint

Algebraic, Analytic, and Computational Number Theory and Its Applications

Edited by: Diana Savin , Nicusor Minculete and Vincenzo Acciaro

Analytic number theory is a branch of number theory which uses methods from mathematical analysis in order to solve difficult problems about integers. Analytic number theory can be split into two major areas: multiplicative number theory and additive number theory. Bernhard Riemann made some very important contributions to the field of analytic number theory; among others, he investigated the Riemann zeta function, and he established its importance for understanding the distribution of prime numbers. A typical problem of analytic number theory is the enumeration of number-theoretic objects like primes, solutions of Diophantine equations, etc. Algebraic number theory on the other hand studies the arithmetic of algebraic number fields, i.e., the ring of integers of arbitrary number fields. It embraces, among others, the study of the ideals and of the group of units in the ring of integers and the extent to which unique factorization holds. The purpose and scope of this "Special Issue" were to collect new results in algebraic number theory and analytic number theory (namely in the areas of ramification theory in algebraic number fields, class field theory, arithmetic functions, L-functions, modular forms and elliptic curves) and in some similar research areas (namely associative algebras, logical algebras, elementary number theory, combinatorics, difference equations, group rings and algebraic hyper-structures).

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