Preface

Basic hypergeometric series, often shortened as q-series, has developed rapidly during the past two decades. Its increasing importance to theoretical physics, computer science and classical mathematics (algebra, analysis and combinatorics) has widely been understood and accepted. Nowadays q-series is fully in its flourishing period and there is indeed a necessity to have an introduction book on the topic.

This book originates from the teaching experience of the first author. In the spring of 2000, a series of lectures entitled *Classical Partitions and Rogers-Ramanujan Identities* was delivered by the first author at Lecce University (Italy). The same program was then replayed in the summer of 2001 at Dalian University of Technology (China). In the spring of 2002 and 2004, these lectures have been extended to a course for PhD students again at Lecce University under the cover-title *Teoria dei Numeri*. The second author is one among the participants of these lectures.

The main purpose of the book is to present a brief introduction to basic hypergeometric series and applications to partition enumeration and number theory. As a short account to the theory of partitions, the first part (Chapters **A-B-C**) covers the algebraic aspects (basic structures: partially ordered sets and lattices), combinatorial aspects (generating functions and Durfee rectangles), and analytic aspects (the Jacobi triple products and Rogers-Ramanujan identities). Further development toward basic hypergeometric series and bilateral counterparts is dealt with in the second part (Chapters **D-E-F**). Applications to the representations of natural numbers by square sums and Ramanujan's congruences on partition function are presented in the third and the last part (Chapters **G-H**).

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