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Lattice Sums Then and Now

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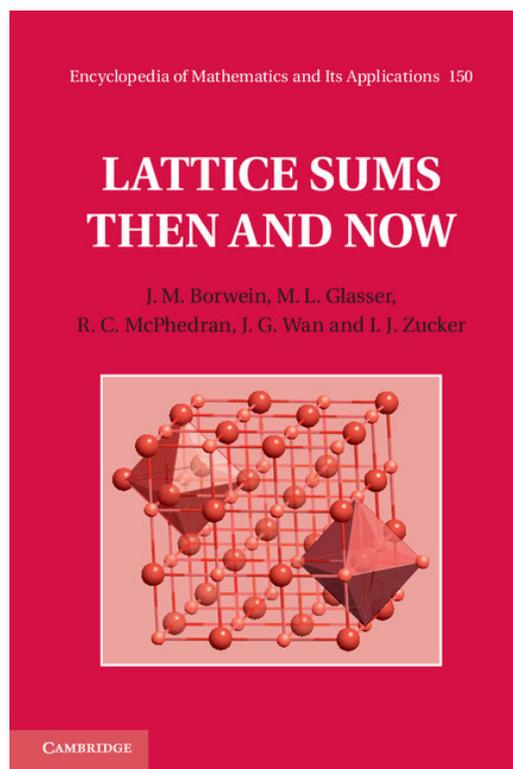
About the Book

The study of lattice sums began when early investigators wanted to go from mechanical properties of crystals to the properties of the atoms and ions from which they were built (the literature of Madelung's constant). A parallel literature was built around the optical properties of regular lattices of atoms (initiated by Lord Rayleigh, Lorentz and Lorenz). For over a century many famous scientists and mathematicians have delved into the properties of lattices, sometimes unwittingly duplicating the work of their predecessors. Here, at last, is a comprehensive overview of the substantial body of knowledge that exists on lattice sums and their applications. The authors also provide commentaries on open questions, and explain modern techniques which simplify the task of finding new results in this fascinating and ongoing field. Lattice sums in one, two, three, four and higher dimensions are covered.

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Key Features

- Expands and updates the seminal paper written by two of the book's authors, M. L. Glasser and I. J. Zucker
- Will be of value to both experienced practitioners and those new to the field
- Assembles results that were scattered across the literature and often underexploited

Contents

Foreword; Preface; 1. Lattice sums; 2. Convergence of lattice sums and Madelung's constant; 3. Angular lattice sums; 4. Use of Dirichlet series with Complex characters; 5. Lattice sums and Ramanujan's modular equations; 6. Closed form evaluations of three- and four-dimensional sums; 7. Electron sums; 8. Madelung sums in higher dimensions; 9. 70 years of the Watson integrals; Appendix A. Tables; Bibliography; Index.

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