I. N. Bronshtein · K. A. Semendyayev

Handbook of Mathematics

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Preface of the Reprint of the 3rd edition

The book is in such high demand that the publisher decided to reprint the 3rd edition published in 1997.

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Preface

In 1957 one of the two Editors translated the Handbook of Mathematics by I. N. Bronshtein and K. A. Semendyayev from Russian into German. In comparison with the original, there were two additional sections "Calculus of variation" and "Integral equations". Over the years this book has become a standard work also in German speaking countries. For nearly two decades it was an indispensable help for many students, teachers and practitioners of mathematics, although in contents and form it hardly changed at all.

During the same period some newer branches of mathematics have undergone a stormy development. Others have gained considerably in importance or have changed rapidly under the influence of practical needs, not least owing to the development of electronic calculating techniques. Even school mathematics did not stand still in the intervening years, so that new points of view emerged in the more elementary parts of the Handbook.

When all these factors were taken into account, a new edition had to incorporate the following points. New topics had to be included, for example, functional analysis, a section on the foundations of mathematics with the title "Sets, relations, functions" (with due regard to the basic concepts of mathematical logic), measure theory and the Lebesgue-Stieltjes integral, tensor calculus, mathematical methods of operational research (linear, non-linear, and dynamical optimization, graph theory, game theory, etc.), numerical methods and computational techniques.

Some sections had to be enlarged substantially or put on new foundations, for example, probability theory and mathematical statistics, or Fourier analysis and the Laplace transformation.

Several essential supplements were needed, among them a section on matrices within the framework of algebra.

In addition, most sections had to be thoroughly revised to keep up with present-day demands.

It goes without saying that such a huge task could not be carried out by a single person in a reasonable time. The problem had to be tackled by a collective of authors. An agreement was reached between the publishers of the original Russian edition and the publishers of the German translation to the effect that the revised version should be a joint undertaking and the preparation should be entrusted to a collective of authors working in close collaboration with the Soviet authors. This team was recruited largely from the scientific personnel of the section Mathematics at the Karl Marx University of Leipzig.

The editors and authors endeavoured to preserve the diction and presentation of the original, in spite of the incorporation of new material. Nevertheless, it was inevitable that the presentation as a whole exhibits less homogeneity than the original book. This is due partly to factual matters such as the widely diverging contents of the individual sections or the varying degree of difficulty of the topics.

At the same time, the editors and authors believe that the Handbook can meet the diverse requirements of the numerous potential users, by the level of sophistication appropriate to the theme at hand.

The editors and authors wish to express their thanks to all who have contributed by their advice and helpful criticism to shaping the ultimate form of the new version of the work. Our special thanks are due to the group of advisors at the Technical University of Karl Marx-Stadt under the direction of Professor Schneider, who drew our attention to the diverse mathematical needs of students and graduates in technical disciplines.

Leipzig, December 1978 The Editors

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