

Foreword

DEAR READER,

The book in your hands is published on the occasion of the Fiftieth Anniversary of the Netherlands Mathematics Foundation SMC (Stichting Mathematisch Centrum), the eldest of the research foundations constituting the Netherlands Organisation for Scientific Research NWO (Nederlandse Organisatie voor Wetenschappelijk Onderzoek).

The intention of this book is to project an image of SMC, for a much broader readership than usual. In fact, its authors have been promised a reader of a general scientific erudition, but without specialized knowledge of either mathematics or computer science. As a level of expertise this is not very well defined and its interpretation can be seen to vary considerably throughout the book, but in all cases the authors presuppose some degree of curiosity more than anything else. The certainty that nobody ever reads a work like this from cover to cover gave an excuse to indulge in a substantial size, which moreover offers the reader the benefit of an ample choice.

The authors are all associates of SMC of long standing, in the sense that either their work has been supported on a project basis as part of the National Mathematics Programme (Landelijke Activiteiten Wiskunde) or that they belong to the research staff of SMC's institute, the Centre for Mathematics and Computer Science CWI (Centrum voor Wiskunde en Informatica). The first part of the text consists of four essays in a general vein, all of which were contributed from outside the institute. But most of the authors of the following shorter articles, comprising the second part

of the book, have also taken SMC's anniversary, so near the turn of the century, as an opportunity for a reflection on their subdiscipline in this temporal perspective. Consequently, the reader in search of contributions of a more historical slant may be somewhat disappointed - however, what there is describes a project that in SMC's history has served as a model of its kind.

Unavoidably, such a collection not only informs about but also gives an account of work done. The book presents samples over the entire range of SMC's activities and doing so invites assessment. After all you, the intended reader, will eventually be asked to foot the bill as a taxpayer. SMC would like to convince you that at least its share of your money is well spent. However, any judgment should take into consideration the goals that were aimed at and it is here that SMC would like to add a note in the margin.

As said, SMC has supported mathematical research at the Netherlands universities for many years. The budget for this research was always relatively modest and the outcome, while never judged less than of high quality by its reviewers, has never provoked international sensation. What, then, is the significance of such an activity and, indeed, its priority in competition with other work in the NWO sphere? In a small country such as The Netherlands, mathematics is bound to have a strong international orientation - in fact, all our best mathematicians cherish affiliations abroad. This being so, it is of prime importance that there exists at least one platform before the national scientific forum where priorities within the discipline can be decided and where important new developments are identified. It is this signal function of SMC which this volume attempts to emphasize.

Another remark concerns the institute CWI, the name of which couples mathematics with another discipline - an alliance deemed by some to be in a range varying from awkward to unholy. SMC is still proud of the fact that the very first steps of computer science in this country were set under its aegis and to the present day it sets with conviction as a theme for its institute: *the synergy of mathematics and computer science*. In fact, the history of mathematics has always shown a strong interaction of this field with the major issues in society. This was the case in the first industrial revolution when mechanics and electrodynamics were among the main items on the mathematical agenda, and again in the second revolution when mathematical methods for optimization and control of deterministic and stochastic systems, both technological and managerial, were developed. Now we are living through the first phase of a third revolution triggered by the developments in information technology, already touching all spheres of human life. The main theme in this phase appears to be the control of the dynamics and complexity of information based processes, of a dimension previously unheard of. If history is any guide, the key to all this will again be in the development of new mathematical concepts. This promises work for many

years to come for applied mathematicians, and much food for thought for their colleagues of the less mundane variety. CWI is opting for an important role in this field and takes the opportunity to show its colours in the third section of this book.

In the mean time, by all this you have been distracted too long from what really was the first aim in this production: to provide good reading!

G.Y. Nieuwland
Chairman of SMC Board of Trustees