

PREFACE

Symbolic computation is one of the most fundamental areas of research in computational science that produces powerful software systems for exact computation and formal reasoning with expressions in symbolic form. Such systems provide a revolutionary way of presenting scientific knowledge and principles to the current generation of students. They have been widely used for education in many disciplines at different levels. How to make the use of symbolic computation systems more effective for education, how to create curricula and dynamic teaching and learning environments into which symbolic computation is integrated, how to design innovative pedagogical methodologies, techniques, and materials based on symbolic computation, how to evaluate the impact of symbolic computation in education, and what type of new methods and tools should be developed for educational purposes? These are some of the questions that have to be considered and studied but cannot be skirted round in today's world where computing technologies play an increasingly important role. Answers to these questions have profound implications for the formulation and implementation of educational policies and programs.

To address the above questions, to exchange ideas and views, and to present research and experiments, more than 40 foreign and Chinese researchers, educators, and other experts actively involved or interested in developing, using, and practicing methods and software tools of symbolic computation for education met at the International Seminar on Symbolic Computation in Education (SCE 2006 — <http://www.cc4cm.org/sce2006>), held at Beihang University, Beijing, China from the 12th to 14th April 2006. This book has evolved from the invited and contributed talks given at the seminar SCE 2006. It presents a collection of articles on current studies and concerns of mathematics education and the use and development of software systems and technologies of symbolic computation for education. The 14 formally refereed articles contained in the book are written mostly by leading experts and educators and cover a wide range of topics from teaching philosophy and curriculum development to symbolic and

algebraic manipulation and automated geometric reasoning, and to the design and implementation of educational software and integrated teaching and learning environments.

The book consists of three related parts: the first part is concerned with the use of technologies for mathematics education at the secondary and undergraduate levels, the second part is devoted mainly to presenting dynamic geometry software and its integration and combination with computer algebra systems for educational purpose, and the third part describes several methods and techniques of symbolic and algebraic computation that have potential applications in mathematics education. The book is worth reading and may serve as a useful reference for researchers, educators, and other professionals interested in symbolic computation and education.

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