

Preface

The Erlangen program provides a fundamental point of view on the place of transformation groups in mathematics and physics. Felix Klein wrote the program, but Sophus Lie also contributed to its formulation, and his writings are probably the best example of how this program is used in mathematics. The present book gives the first modern historical and comprehensive treatment of the scope, applications and impact of the Erlangen program in geometry and physics and the roles played by Lie and Klein in its formulation and development. The book is also intended as an introduction to the works and visions of these two mathematicians. It addresses the question of what is geometry, how are its various facets connected with each other, and how are geometry and group theory involved in physics. Besides Lie and Klein, the names of Bernhard Riemann, Henri Poincaré, Hermann Weyl, Élie Cartan, Emmy Noether and other major mathematicians appear at several places in this volume.

A conference was held at the University of Strasbourg in September 2012, as the 90th meeting of the periodic *Encounter between Mathematicians and Theoretical Physicists*, whose subject was the same as the title of this book. The book does not faithfully reflect the talks given at the conference, which were generally more specialized. Indeed, our plan was to have a book interesting for a wide audience and we asked the potential authors to provide surveys and not technical reports.

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