

Springer Monographs in Mathematics

Marco Manetti

## Lie Methods in Deformation Theory

This book furnishes a comprehensive treatment of differential graded Lie algebras, L-infinity algebras, and their use in deformation theory. We believe it is the first textbook devoted to this subject, although the first chapters are also covered in other sources with a different perspective.

Deformation theory is an important subject in algebra and algebraic geometry, with an origin that dates back to Kodaira, Spencer, Kuranishi, Gerstenhaber, and Grothendieck. In the last 30 years, a new approach, based on ideas from rational homotopy theory, has made it possible not only to solve long-standing open problems, but also to clarify the general theory and to relate apparently different features. This approach works over a field of characteristic 0, and the central role is played by the notions of differential graded Lie algebra, L-infinity algebra, and Maurer–Cartan equations.

The book is written keeping in mind graduate students with a basic knowledge of homological algebra and complex algebraic geometry as utilized, for instance, in the book by K. Kodaira, *Complex Manifolds and Deformation of Complex Structures*. Although the main applications in this book concern deformation theory of complex manifolds, vector bundles, and holomorphic maps, the underlying algebraic theory also applies to a wider class of deformation problems, and it is a prerequisite for anyone interested in derived deformation theory.

Researchers in algebra, algebraic geometry, algebraic topology, deformation theory, and noncommutative geometry are the major targets for the book.

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