Tracts in Mathematics 32

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*K*3 Surfaces
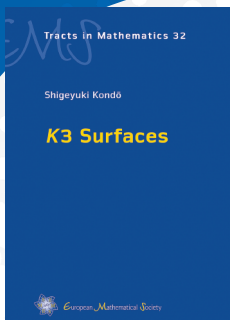
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*K*3 Surfaces

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*K*3 surfaces are a key piece in the classification of complex analytic or algebraic surfaces. The term was coined by A. Weil in 1958—a result of the initials Kummer, Kähler, Kodaira, and the mountain K2 found in Karakoram. The most famous example is the Kummer surface discovered in the 19th century. *K*3 surfaces can be considered as a 2-dimensional analogue of an elliptic curve, and the theory of periods—called the Torelli-type theorem for K3 surfaces—was established around 1970. Since then, several pieces of research on *K*3 surfaces have been undertaken and more recently *K*3 surfaces have even become of interest in theoretical physics.

This book is an introduction to the Torelli-type theorem for complex analytic *K*3 surfaces and its applications. The theory of lattices and their reflection groups is necessary to study *K*3 surfaces, and this book introduces these notions. In addition to lattices and reflection groups, the book contains the classification of complex analytic surfaces, the Torelli-type theorem, the subjectivity of the period map, Enriques surfaces, an application to the moduli space of plane quartics, finite automorphisms of *K*3 surfaces, Niemeier lattices and the Mathieu group, the automorphism group of Kummer surfaces and the Leech lattice.

This book will prove helpful to researchers in algebraic geometry and related areas and to graduate students with a basic grounding in algebraic geometry.