

FEATURED TITLES FROM THE EUROPEAN MATHEMATICAL SOCIETY

K3 Surfaces

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K3 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. *K3* 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.

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Accuracy of Mathematical Models

Dimension Reduction,
Homogenization, and
Simplification

Sergey J. Repin, *Russian Academy of Sciences,
St. Petersburg* and Stefan Sauter, *University of
Zürich, Switzerland*

The expansion of scientific knowledge and the development of technology are strongly connected with quantitative analysis of mathematical models. Accuracy and reliability are the key properties we wish to understand and control.

This book presents a unified approach to the analysis of accuracy of deterministic mathematical models described by variational problems and partial differential equations of elliptic type. It is based on new mathematical methods developed to estimate the distance between a solution of a boundary value problem and any function in the admissible functional class associated with the problem in question. The theory is presented for a wide class of elliptic variational problems. It is applied to the investigation of modelling errors arising in dimension reduction, homogenization, simplification, and various conversion methods (penalization, linearization, regularization, etc.). A collection of examples illustrates the performance of error estimates.

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