

Springer Monographs in Mathematics

Andrei Bogatyrev

Extremal Polynomials and Riemann Surfaces

The problems of conditional optimization of the uniform (or C -) norm for polynomials and rational functions arise in various branches of science and technology. Their numerical solution is notoriously difficult in case of high degree functions. The book develops the classical Chebyshev's approach which gives analytical representation for the solution in terms of Riemann surfaces. The techniques born in the remote (at the first glance) branches of mathematics such as complex analysis, Riemann surfaces and Teichmüller theory, foliations, braids, topology are applied to approximation problems.

The key feature of this book is the usage of beautiful ideas of contemporary mathematics for the solution of applied problems and their effective numerical realization. This is one of the few books where the computational aspects of the higher genus Riemann surfaces are illuminated. Effective work with the moduli spaces of algebraic curves provides wide opportunities for numerical experiments in mathematics and theoretical physics.

Mathematics

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