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Logarithmic potential theory with applications to approximation theory. (English)

Summary: We provide an introduction to logarithmic potential theory in the complex plane that particularly emphasizes its usefulness in the theory of polynomial and rational approximation. The reader is invited to explore the notions of Fekete points, logarithmic capacity, and Chebyshev constant through a variety of examples and exercises. Many of the fundamental theorems of potential theory, such as Frostman’s theorem, the Riesz Decomposition Theorem, the Principle of Domination, etc., are given along with essential ideas for their proofs. Equilibrium measures and potentials and their connections with Green functions and conformal mappings are presented. Moreover, we discuss extensions of the classical potential theoretic results to the case when an external field is present.

MSC:
30E10 Approximation in the complex plane
31A15 Potentials and capacity, harmonic measure, extremal length and related notions in two dimensions
41A20 Approximation by rational functions

Keywords: logarithmic potential; polynomial approximation; rational approximation; Fekete points; subharmonic functions

Full Text: EMIS