

# EQUILIBRIUM MEASURES AND POLYNOMIALS

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Potential theoretical methods have turned out to be useful in different areas of mathematical analysis. In the last 20 years or so they have revolutionized several branches of approximation theory and orthogonal polynomials. In many problems not only the proofs, but even proper formulation of the results require the use of such concepts as Green's functions, equilibrium measures, logarithmic potentials etc. In the present talk we offer a glimpse of how potential theory works in approximation theory and in polynomial inequalities. We shall present a quick introduction to equilibrium measures and their modification when an external field is present. Then apply this modification of Frostman's theory to a Weierstrass-type approximation that is at the core of several results for orthogonal polynomials and rational approximation. We shall also present a recent method of transferring results from an interval to compact sets which is based on taking polynomial inverse images. This method is applied for polynomial inequalities, and for establishing asymptotics for Christoffel functions and best approximation. At the heart of the method is a density theorem of polynomial inverse images of intervals, which turns out to be connected with the open mapping property of some elementary monotone systems.