Workshop dedicated to the memory of Professor Gabriela Kohr
(3rd edition)
Geometric Function Theory in Several Complex Variables and Complex Banach Spaces

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Extremal length distortion and weak conformality

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Abstract

The notions of quasiconformality and quasiregularity in a domain are natural extensions of the notion of conformality. The automorphism $f(z) = z(\sqrt{|z|} + 1)/2$ of the unit disk provides a simple example of a quasiconformal mapping, which is conformal only at the origin. The interest to a question whether global quasiconformality or its generalizations can guarantee for a mapping to be conformal at a prescribed point has been raised more than 80 years ago starting from the papers by Menshoff and Teichmüller. There exist several equivalent definitions of quasiconformal and quasiregular mappings. Each of them involves certain tools. Among the most powerful methods for studying geometric features of quasiconformal and of quasiregular mappings is the method of extremal lengths (moduli) which goes back to the classical work of Ahlfors-Beurling. The goal of our talk is to present new inequalities for moduli of the families of curves (paths) involving the integrals containing the so-called directional dilatations.

An additional purpose of the talk is to discuss some local conditions that are weaker than conformal and present a wide range of illustrating examples. All such results can be regarded as Teichmüller-Wittich-Belinskiĭ type theorems.