

## Vladimir Ryazanov: Moduli in the modern mapping theory.

**Abstract:** The report reflects the content of one of the chapters of our joint book with Olli Martio, Uri Srebro and Eduard Yakubov under the same name whose publication is expected to the end of this year in Springer. The book shows that the moduli method which is due to Ahlfors remains a very effective geometric tool for the study of various modern classes of mappings with finite distortion and the corresponding Beltrami equations with singularities.

My account is devoted to the theory of quasiconformal mappings and their generalizations in arbitrary metric spaces with measure and dedicated to the memory of Juha Heinonen. As you remember, he together with Pekka Koskela had a great paper in Acta Math. and then he published a book on the so-called Loewner spaces including, in particular, the well-known groups by Carnot and Heisenberg and he has many successors in this direction.

In particular, we study properties of weakly flat spaces which just are a far-reaching generalization of those recently introduced Loewner spaces. On this base, we create the theory of the boundary behavior and removability of singularities for quasiconformal mappings and their generalizations in the mentioned classes of spaces, say in the Riemannian manifolds. For instance, we prove generalizations and strengthenings of the known Gehring–Martio theorem on homeomorphic extension to the boundary of quasiconformal mappings between quasiextremal distance domains in  $\mathbb{R}^n$ ,  $n \geq 2$ .