P. Grinevich

"Conformal geometry"

Program

- 1. Conformal transformations. Definition. Infinitesimal conformal transformations. Lie derivative of metric tensor with respect to a generator of conformal transformation.
- 2. Möbius transformations of \mathbb{R}^n . The Lie algebra of Möbius group. Theorem: For $n \geq 3$ the Lie algebra of local conformal vector fields \mathbb{R}^n is finitedimensional and coincide with the Lie algebra of Möbius group.
- 3. Möbius transformations of \mathbb{R}^n from isometries of $\mathbb{R}^{n+1,1}$.
- 4. Weil, Schouten and Cotton tensors. The formula expressing the Riemann tensor in terms of metric and Ricci tensors for n = 3. Transformations properties of the Weil and Cotton tensors under conformal changes of Riemannian metric.
- 5. Necessary and sufficient conditions for conformal flatness (without proof).
- 6. Isothermal coordinate on two-dimensional surfaces. Beltrami equation. All 2-dimensional Riemannian manifolds are conformally flat. Local conformal maps are holomorphic or anti-holomorphic maps.
- 7. Teichmüller space and moduli space for tori. Fundamental domain in the Teichmüller space for tori.
- 8. Beltrami differentials on Riemann surfaces as generators of conformal structures deformations. The tangent space to the moduli space.