Block-Building & Deformations of Polyhedra, Group Homomorphisms and Quasiregular Mappings

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Abstract

We discuss our method of block-building of conformal polyhedra in the 3-sphere, their "bending" deformations and several applications to geometry, topology and geometric analysis. This is related to varieties of conformal structures on closed hyperbolic 3-manifolds, to the shape of non-trivial compact 4-dimensional cobordisms \( M \) (cf. [1], [4]) whose interiors have complete hyperbolic structures (how the global geometry and topology of such cobordisms depends on properties of the variety of discrete representations of the fundamental group of its boundary \( \partial M \) -cf. [2, 3]), to different ergodic actions of a uniform hyperbolic 3-lattice [6], as well as to M.A.Lavrentiev problem on locally homeomorphic quasi-regular mappings in 3-space [7]. This gives also a new view on Andreev’s hyperbolic polyhedron theorem.