On combinatorial Riemannian manifolds

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A combinatorial Riemannian manifold (CRM) is a mixture of an Euclidean simplicial complex and a combinatorial manifold [1]. It is an abstract simplicial complex with given edge lengths and flattenings at the vertices, satisfying certain realizability conditions. The describing data are of finite combinatorial and algebraic nature. We report how some notions of smooth differential geometry can be translated to corresponding combinatorial notions, and how CRM can approximate Riemannian manifolds (see [1], [2]; we will also report on new results not published so far).

References

[1] Stephan Klaus, *Pseudo-angle systems and the simplicial Gauss-Bonnet-Chern theorem*, London Math. Soc. Lecture Note Ser., 463, Cambridge University Press, Cambridge, 2021, 311–325.

[2] Stephan Klaus, *On combinatorial Gauss-Bonnet theorem for general Euclidean simplicial complexes*, Front. Math. China 11 (2016), no. 5, 1345–1362.