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A Projective Framework for Polyhedral Mesh Modeling

Amir Vaxman

(TU Wien)

I present a novel framework for polyhedral mesh editing with face-based projective maps, that preserves planarity by definition. Such meshes are essential in the fields of construction and architectural design. By using homogeneous coordinates to describe vertices, we gain a rich and linear shape space of meshes with planar faces. The generality of this space allows for polyhedral geometric processing methods to be conducted with ease. We demonstrate its usefulness in polyhedral mesh subdivision, a resulting multi-resolution editing algorithm, and novel shape space exploration possibilities. Furthermore, we show that our shape space is a discretization of a continuous space of conjugate-preserving projective transformation fields on surfaces.

Johannes Wallner