Geometric averaging approach in subdivision schemes of point-normal pairs

Evgeny Lipovetsky School of Computer Sciences, Tel-Aviv Univ., Tel-Aviv, Israel evgenyl@post.tau.ac.il

Subdivision is a well-known and established method for generating smooth curves/surfaces from discrete data by repeated refinements. The typical input for such a process is a mesh of vertices. In this work we propose to refine 3D data consisting of vertices of a quadrilateral mesh and a normal at each vertex. We adapt several well known linear subdivision schemes refining points and generating surfaces, such as Catmull-Clark and Kobbelt 4-point, to subdivision schemes refining point-normal pairs. Each adaptation is based on a geometric operation between two point-normal pairs. For the case when the initial data consists of a control mesh only, a naive method for choosing initial normals is proposed.

The performance of different adapted subdivision schemes is compared on several examples of control meshes.

Joint work with: Nira Dyn.