Measure Dependent Subdivision Schemes

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The standard derivation of a subdivision scheme usually involves the enforcement of a smoothness property that most often takes form of a polynomial reproduction. In this case the polynomials are considered on the discrete set represented either by their values or by a local averaging over the basic elements of the corresponding partition. The standard is to consider the averaging in terms of a uniform measure. Here we want to examine the possibility to consider nonuniform measures in defining the averages. The main goal is to handle situations in which the subdivision surface has holes and boundaries without changing the general setup of the scheme.

The refinement rule that handles the subdivision of the nonuniform measure uses as refinable quantities the first few moments over the basic elements of a quadrilateral partition. We impose the preservation of certain piecewise uniform measures and investigate the resulting subdivision schemes.