

Determining the JSR of Palindromic Matrices

G^1 -Error Bounds for Proxy Splines

Geometric Subdivision

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Abstract

Determining the JSR of Palindromic Matrices: It is well known that the Hölder exponent α of the highest existing derivative of functions generated by a linear stationary subdivision algorithms is related to the joint spectral radius of a pair of matrices. In case of symmetry, these matrices are palindromic. While it is easy to bound α from below and above, the exact value is typically unknown. Based on recent progress in the analysis of the four-point scheme [1], we want to develop an algorithm for determining α precisely.

G^1 -Error Bounds for Proxy Splines: In the monograph [2], the concept of proxy splines was introduced as a generalization of the well-known control mesh. Estimates on the deviation between a proxy spline and the corresponding subdivision surface are also provided there. However, similar estimates for the deviation of normals (which might be much more important for applications) have not been given so far. We want to elaborate on preliminary results by Hartmann [3] and try to find optimal bounds.

Geometric Subdivision: Recently, Dodgson and Sabin suggested a circle-preserving variant of the four-point scheme [4] with excellent shape properties. We want to generalize the approach to the surface case.

References

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- [3] R. Hartmann, *Subdivision Algorithms*, PhD thesis, in preparation.
- [4] M. Sabin and N. Dodgson, *A circle-preserving variant of the four-point subdivision scheme*, in: Dahlen et al (eds.), *Mathematical Methods for Curves and Surfaces*, Brentwood, 275–286.