A shape-preserving C^2 stationary subdivision schemes with the fourth-order accuracy

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We present a shape-preserving subdivision scheme with a tension parameter that generalizes the four-point Deslauriers-Dubuc scheme and the cubic B-spline. Whereas many shape-preserving schemes are non-linear and non-uniform, the proposed scheme is linear and stationary. The refinement rule has the same support length as the four-point scheme and provides fourth-order accuracy. The scheme is nearly interpolant such that by sacrificing the interpolating property, it attains an improved smoothness, that is C^2, while the interpolatory four-point scheme is C^1. In addition, we show that the proposed scheme preserves monotonicity and convexity under some mild conditions. Some numerical examples are presented to illustrate the performance of the proposed scheme.

Joint work with: Hyoseon Yang and Jungho Yoon

References

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