A factorization framework for Hermite subdivision schemes reproducing polynomials of high degree

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Hermite subdivision schemes are iterative refinement algorithms which produce a function and its derivatives in the limit. In this talk we are interested in Hermite subdivision schemes which reproduce polynomials of high degree. We show that this can be characterized by operator factorizations involving Taylor operators and difference factorizations of a rank one vector scheme. Explicit expressions for these operators are derived, which are based on an interplay between Stirling numbers and p-Cauchy numbers. Furthermore, we discuss how this framework can be used to prove high smoothness of the limit functions.

The talk is based on the papers [1, 2].

Joint work with: Costanza Conti, Svenja Hüning, Tomas Sauer.

References

[1] C. Moosmüller, S. Hüning, C. Conti. Stirling numbers and Gregory coefficients for the factorization of Hermite subdivision operators. *IMA Journal of Numerical Analysis*, 41(4):2936–2961, 2021.

[2] C. Moosmüller, T. Sauer. Factorization of Hermite subdivision operators from polynomial over-reproduction. *Journal of Approximation Theory*, 271: article number 105645, 2021.