Technion-Israel Institute of Technology

Computer Science Department

Center for Graphics and Geometric Computing

CGGC Seminar

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Barycentric rational interpolation of a function and its derivatives

Floater–Hormann interpolants constitute a family of barycentric rational interpolants based on the blend of local polynomial interpolants of degree d that have recently proved to be a viable alternative to more classical interpolation methods, such as polynomials and splines, especially in the equispaced setting.

In the first part of this seminar we focus on the approximation of the derivatives of a function f with classical Floater–Hormann interpolants and show how their k-th derivative converge to f^{(k)} at the rate of O(hj^{d+1-k}), for any k>=0 and any set of well-spaced nodes, where hj is the local mesh size. In the second part we instead focus on the interpolation of the derivatives of a function up to order m and we introduce a new iterative approach that allows us to generalise the Floater–Hormann family to this new setting. The resulting rational Hermite interpolants converge to the function at the rate of O(h^{(m+1)(d+1)}) as the mesh size h converges to zero. Finally, we show the reasons that make our approach one of the state-of-the-art methods for fitting samples given at equispaced data, by showing that its condition number is bounded from above by a constant independent of n.

The lecture will be held on Sunday, 19.05.2019, at 13:30, Taub 337

הזמנה זו מהווה אישור כניסה עם רכב לטכניון