

Lothar-Collatz-Seminar

Mon, 07. October · 14:00 · Geom 1528

Juliane Entzian (Universität Hamburg)

Structure Analysis of Nonstandard Kernels for Multivariate Reconstructions

Abstract:

This talk concerns adaptive kernel-based approximation methods. We create a toolbox for adapting kernels to underlying problems, focusing on the interpolation of multivariate scattered data with an emphasis on anisotropies. By developing five nonstandard classes of flexible kernels – transformation, summation, and product kernels, as well as anisotropic versions of the latter two orthogonal summation, and tensor product kernels – significant limitations of traditional radially symmetric kernels are addressed. These classes, some entirely new and others building on existing structures, provide the flexibility to select and combine kernels tailored to specific problems. Thus, they extend the variety of interpolation methods.

The theoretical analysis conducted on each kernel class's native space not only expands the understanding of native spaces in general but also enlightens underlying (name-giving) structures and their associated benefits. We investigate the interpolation method for each kernel, including impacts on accuracy and stability.

Numerical tests confirm the theoretical findings and show which kernel class is suitable for specific problem adaptations: We propose transformation or tensor product kernels for adapting to the point set; transformation kernels for adapting to the domain; and summation, transformation, or orthogonal summation kernels for adapting to the target function.

For further information please contact

Dr. Claus Goetz (claus.goetz@uni-hamburg.de), or visit
www.c3s.uni-hamburg.de/news-events/seminar-c3s.html

