

## **Summation Kernels: Construction, Benefits and Limits**

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Kernel based methods are popular tools for multivariate scattered data interpolation. However, it is difficult to combine good accuracy with numerical stability. In order to tackle this problem, there are already approaches such as choosing alternative bases (e.g. Newton basis) or greedy methods. We explore new ways to adapt the interpolation kernel itself to the underlying problem.

This talk is concerned with the construction of summation kernels, where we distinguish between standard and anisotropic kernels. Due to Aronszajn (1950), a finite standard sum of positive semi-definite kernels is again positive semi-definite. We extend Aronszajn's theory to intersection kernels and infinite countable summation kernels. Supporting numerical examples illustrate the computational advantages of anisotropic summation kernels and their flexibility.

But we also discuss limits of the proposed interpolation scheme.