Contribution ID: **34** Type: **Talk**

A hybrid Chebyshev-Tucker tensor format with applications to multi-particle modelling

Monday 17 February 2025 16:00 (30 minutes)

In this talk, we introduce a mesh-free two-level hybrid Tucker tensor format for the approximation of multivariate functions. This new format combines the product Chebyshev interpolation with the ALS-based Tucker decomposition of the coefficients tensor. The benefits of this tensor approximation are two-fold. On the one hand, it allows to avoid the rank-structured approximation of functional tensors defined on large spatial grids, while on the other side, this leads to the Tucker decomposition of the core coefficient tensor with nearly optimal ε-rank parameters, which are shown to be much smaller than both the polynomial degree of the Chebyshev interpolant and the potential number of spatial grid points in the commonly used grid-based discretizations. We discuss the error and complexity estimates of the presented method and demonstrate its efficiency on the demanding example of multi-particle interaction potentials generated by the 3D Newton kernel.

Authors: BENNER, Peter; KHOROMSKAIA, Venera (Max-Planck-Institute for mathematics in the Sciences); KHOROMSKIJ, Boris (Max-Planck Institute for Mathematics in the Sciences, Leipzig); SUN, Bonan (Max Planck Institute Dynamics of Complex Technical System)

Presenter: SUN, Bonan (Max Planck Institute Dynamics of Complex Technical System)

Session Classification: Contibuted Talk