

Bart Vandereycken

"Differential geometry for tensors with fixed hierarchical Tucker rank"

Abstract:

Recently, a number of authors have presented several geometries for rank-structured matrix and tensor spaces, namely the set of matrices or tensors with fixed matrix, Tucker or TT rank. In this talk we present a unifying approach for establishing a smooth, differential structure on the set of tensors with fixed hierarchical Tucker rank. Our approach describes this set as a smooth submanifold, globally embedded in the space of real tensors. The previous spaces are shown to be specific instances of a particular hierarchical Tucker tree (possibly with additional constraints on the frames). If time permits, we conclude with some numerical experiments that make use of the derived geometry. This is joint work with Andre Uschmajew, TU Berlin.