

Prof. Daniel Kressner

Mathematics Institute of Computational Science and Engineering - MATHICSE

SEMINAR OF NUMERICAL ANALYSIS

➤ **FRIDAY 7 DECEMBER 2012 - ROOM MA A1 10 - 11h15**

Prof. Ralf Hiptmair, (ETH, Zürich, Switzerland) will present a seminar entitled:

"Multiple point evaluation on combined tensor product supports"

Abstract:

The presentation has its focus on the design of an efficient algorithm for a problem encountered in the context of semi-Lagrangian methods on sparse grids spaces. We consider the multiple point evaluation problem for an n -dimensional space of functions $[-1,1]^d \rightarrow \mathbb{R}$ spanned by d -variate basis functions that are the restrictions of simple (say linear) functions to tensor product domains. For arbitrary evaluation points this task is faced in the context of (semi-)Lagrangian schemes using adaptive sparse tensor approximation spaces for boundary value problems in moderately high dimensions.

We devise a fast algorithm for performing $m \geq n$ point evaluations of a function in this space with computational cost $O(m \log^d n)$. We resort to nested segment tree data structures built in a preprocessing stage with an asymptotic effort of $O(n \log^{d-1} n)$.

References : [1] R. Hiptmair, G. Phillips, and G. Sinha, Multiple point evaluation on combined tensor product supports, Numerical Algorithms, (2012). DOI: 10.1007/s11075-012-9624-4.

Lausanne, 22 November 2012 / DK/cr

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