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Mathematics Institute of Computational Science and Engineering - MATHICSE

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SEMINAR OF NUMERICAL ANALYSIS

➢ **FRIDAY 10 MAI 2013 - 14 h 15,   ROOM MA A3 30**

Dr. Ivan Osedelets, *(Russian Accademy of Sciences, Moscow, Russia)* will present a seminar entitled:

"*Tensor methods in numerical modelling*"

Abstract:

High-dimensional problems appear in many applications, including solution of integral and differential equations on fine grids, quantum chemistry and computional material design, model reduction, uncertainty quantification and data mining.
In my talk, I will present the current state of art for numerical tensor methods and outline promising research directions.
It is clear, that numerical modelling is becoming more and more high-dimensional, thus the development of new algorithms and software is necessary: the standard numerical algorithms do not scale well for high-dimensional problems, and here new methods come into play.
In the recent years, numerical techniques for the approximation of multiway arrays (tensors) have proven to be a very effective approach in multidimensional applications.
The main tool in the numerical tensor methods I will describe is the so-called Tensor Train (TT) representation of high-dimensional tensors. TT-format is an effective algebraic technique for the numerical separation of variables. It can be considered as multidimensional generalization of the singular value decomposition (SVD), and can be computed using standard numerical tools.
The specific research problems where tensor methods have a high potential impact include block-low rank approximation and solution of PDEs, construction of reduced order models for parametric systems, compression of multidimensional data and global optimization of multivariate functions in drug design.

Lausanne, 02. Mai 2013/DK/cr

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The seminars taking place at the Section of Mathematics are announced on internet address : www
http://mathicse.epfl.ch/seminars