

Generalized sparse grid methods and applications

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High-dimensional problems appear in various mathematical models. Their numerical approximation involves the well-known curse of dimension, which renders any direct discretization obsolete. One approach to circumvent this issue, at least to some extent, is the use of generalized sparse grid methods, which can exploit additional smoothness properties if present in the underlying problem.

In this talk, we will discuss the main principles and basic features of generalized sparse grids and show their application in such diverse areas as econometrics, fluid dynamics, quantum chemistry, uncertainty quantification and machine learning.