

p -VERSION OF SPARSE GRIDS WITH GLOBALLY CONTINUOUS DISCRETIZATION

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ABSTRACT. Approximation problems in high dimensions arise in numerous applications such as problems with random data, quantum chemistry, quantitative finance etc. Frequently, the computational domain has a relatively simple tensor product structure (e.g. d -dimensional cube or torus) and the tensor product discretization is straight forward. Unfortunately, the tensor product discretization leads to exponentially growing number of unknowns w.r.t. the spatial dimension d , which is known as the "curse of dimensionality". Sparse Grid technique allows to overcome this difficulty under additional regularity assumptions, cf. [1] for an overview.

In this talk we construct a p -version of sparse grids with globally continuous discretization and give an application to Boundary Integral Equations with random data. This is an extension of the recent analysis [2] for globally discontinuous discretization.

Keywords: Sparse grids, p -version, Boundary element method, Integral equations

REFERENCES

- [1] H.-J. Bungartz, M. Griebel, Sparse grids, *Acta Numerica*, 13, 2004, pp.147–269
- [2] A. Chernov, Ch. Schwab, Sparse p -version BEM for first kind boundary integral equations with random loading, *Applied Numerical Mathematics* 59 (2009), pp. 2698–2712

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