

# $\mathcal{H}^2$ matrix based Wavelet Galerkin BEM

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This talk is devoted to the fast solution of boundary integral equations on unstructured meshes by the Galerkin scheme. To avoid the quadratic costs of traditional discretizations with their densely populated system matrices it is necessary to use fast techniques such as hierarchical matrices, the multipole method or wavelet matrix compression, which will be the topic of the talk.

On the given, possibly unstructured, mesh we construct a wavelet basis providing vanishing moments with respect to the traces of polynomials in the space. With this basis at hand, the system matrix in wavelet coordinates can be compressed to  $\mathcal{O}(N \log N)$  relevant matrix coefficients, where  $N$  denotes the number of unknowns.

For the computation of the compressed system matrix with suboptimal complexity we will present a new method based on the strong similarities of substructures of the  $\mathcal{H}^2$  matrices and the used wavelet basis.

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