

# Gastvortrag

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09.00 Uhr  
Seminarraum II

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## **A toolbox for time domain boundary elements in 3d**

### Abstract:

We discuss the challenges of practical TDBEM computations in three dimensions. Algorithms and numerical results are presented for the single layer, hypersingular and Poincare-Steklov operators, in the case of linear boundary problems, on adaptive or graded meshes, and in applications to nonlinear contact problems and the sound emission of tires.

Based on retarded potentials, the Galerkin discretization of time domain boundary elements requires the integration over a time-dependent domain in space, the so called light cones. The domain is decomposed into intersections of elements of a given mesh with the light cones, and an hp-graded numerical quadrature resolves the singular integrand. We deal with the resulting big space-time matrices in an MOT ("marching-on-in-time") time-stepping scheme. We present the procedures done with our toolbox and how they are used to assemble more involved operators like the Poincare-Steklov operator, or also on non-uniform meshes. In particular, for the single layer potential residual and hierarchical error estimators and the resulting adaptive mesh refinements are considered.