Robust BE domain decomposition methods in acoustics

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In this talk we will present a boundary element tearing and interconnecting approach for the Helmholtz equation. In contrary to the Laplace equation it is in general not known if local Dirichlet or Neumann problems admit a unique solution. So one has to stabilize the standard approach to get rid of artificial eigenfrequencies of the local problems. In this talk we will present a stabilized approach which leads to a uniquely solvable discrete system. This will be done in two steps: First Robin boundary conditions are introduced to ensure the solvability of the local problem. But the Steklov-Poincare operator, which is used in the formulation may not well defined if the local Dirichlet problem is not uniquely solvable. So we introduce an alternative formulation for the local problem which leads to an always well defined and uniquely solvable formulation. Additionally, one can prove that also the discrete local and the discrete global problem have a unique solution.

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