Shape Optimization for Wave Emitters

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Abstract: The main topic of this talk is the optimization of the boundary surface of wave emitters such that reflections inside the cone are minimized, thus maximizing the radiated wave energy. The problem is considered in three dimensions. In two dimensions the problem can be made stationary by considering the formulation in the frequency space, which is not possible for the three dimensional problem here. Thus, we conduct a numerical shape optimization governed by the transient wave equation. The wave equation and adjoint equation is discretized using a Discontinuous Galerkin discretization that runs both forward and backward in time and the shape gradient for a deformation of the horn surface is computed using shape calculus and the Hadamard from.

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