ESTIMATION OF NOISE SOURCES USING AN ENHANCED FINITE ELEMENT FORMULATION

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This paper deals with discrete inverse problem in acoustics. It is assumed that the number of acoustic sources are located at known spatial positions and that the acoustic velocity is measured at a number of spatial positions in the radiated field. The situations will be restricted to steady states and due to the type of application that is being envisaged only internal acoustic problems. The Macroelement Post-Processing recovery technique is based on residuals of equilibrium equation and irrotationality conditions. The derivatives are recovered by solving local variational problems exploring special superconvergence behavior occurring in acoustic problems.

The specific situation the source will be modelled by $p(x,t) = P_0(x)e^{iwt}$ with w known, therefore the identification problem is set as find the distributions $P_0(x)$ over boundary Γ_M measured. One of the more laborious step of the minimization algorithm is the computations of the gradient of the lagrangian. The important issue is the computation of the sensitivity, which will be avoided by the use an adjoint problem. A conjugated gradient method will be used for optimization. A number of comprehensive simulation is presented in order to access the main features of the problem proposed.

References

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