

Unique continuation for the Helmholtz equation using a stabilized finite element method

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We consider a unique continuation problem for the Helmholtz equation and introduce a stabilized finite element method solving it. This problem is motivated for example by acoustic inverse boundary value problems: certain reconstruction methods, for instance the Boundary Control method, rely on solving unique continuation problems for the wave equation. Our analysis of the finite element method is based on conditional stability estimates with constants independent of the wave number. These estimates are closely related to the so-called increased stability estimates, studied first by Isakov. We use the conditional stability estimates to obtain convergence estimates that are robust with respect to the wave number. Computational examples will be presented. The talk is based on a joint work with E. Burman and M. Nechita.