



THE UNIVERSITY OF
CHICAGO

Computational and Applied Mathematics
&
Statistics Student Seminar

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Boundary Integral Methods for Generalized Impedance Boundary Conditions

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Jones 303

ABSTRACT

Generalized impedance boundary conditions (GIBCs) provide an accurate approximation for a variety of physical phenomena associated with thin coatings and boundary layer effects. In this talk, we present a well-conditioned numerical method for the solution of GIBC problems, based on the reformulation of the PDE as an integral equation. We apply a combined layer representation, which together with an analytic surface preconditioner, yields a Fredholm second-kind integral equation. It is also common in the literature, and presents several advantages for optimization and design, to use domain decomposition methods. When domain decomposition is employed, the resulting problem has a mixed boundary condition, leading to some additional singularities that we eliminate using appropriate image sources.