THE UNIVERSITY OF CHICAGO

Computational and Applied Mathematics & Statistics Student Seminar

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Efficient representations for Elastodynamics

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Social Sciences 401

ABSTRACT

Elastic waves are involved in a number of important phenomena, from the detection of earthquakes to the bending and flexing of floating ice sheets. These effects are frequently modeled using a time-harmonic wave equation with zero traction boundary conditions. In this talk, we show that it is possible to reduce the problem to an integral equation defined solely on the boundary of the domain. This integral representation uses charge strings to cancel singularities in the integral operators, leading to a Fredholm second kind integral equation. This formulation is readily amenable to existing fast algorithms, and we demonstrate its effectiveness by computing vibrational modes for some relevant problems of interest.