

ACMS Applied Math Seminar

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Thursday, November 6, 2025
154 Hurley Hall
3:30 PM – 4:30 PM

Integral Equations for Linear Flexural-Gravity Waves

Flexural waves, the propagation of waves in thin elastic sheets, arise in a number of contexts, and, particularly, in the study of ice shelves. In the frequency domain, they are commonly modeled as a fourth order PDE in two dimensions with clamped plate, free plate, or supported plate boundary conditions. Here, we review existing approaches for solving boundary value problems of this type, and discuss some limitations. Building on this, for the supported plate and free plate problems, we propose novel representations which ultimately reduce the problems to second kind integral equations. Moreover, the resulting integral equations are amenable to standard high order discretization approaches and fast algorithms. Several numerical examples will be presented which illustrate the properties of these integral equations. Finally, generalizations to other wave phenomena will be discussed.

The Department of Applied and Computational
Mathematics and Statistics

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