ICTS | INTERNATIONAL CENTRE for THEORETICAL SCIENCES

TATA INSTITUTE OF FUNDAMENTAL RESEARCH

ICTS Fluid Dynamics Seminar

Title : Integral formulations and numerical methods for a class of half-space interface problems

Speaker : Manas Rachh (Indian Institute of Technology Bombay)

Date : Tuesday, 07 October 2025

Time : 11:30 AM (IST)

Abstract : A number of multi-scale phenomena are modeled by coupled bulk-surface partial differential equation systems. For example, flexural-gravity models for ice floes couple bending forces in the ice to fluid flow in the sea, resulting in a Laplace equation in the half-space with a fourth order surface differential equation as a boundary condition on $z=0$. A collection of similar problems can be found in the literature, where the boundary effects include flexural, elastic, viscous, thermal, or surface tension effects, and the bulk equations include potential flow and acoustic wave equations. In the case of the half space, there is a particularly effective numerical approach for this class of problems characterized by the use of a nested integral representation for the solution. We will present the main ideas behind the representations and an acceleration scheme for the associated Green's functions, which do not satisfy a PDE on surface. This is joint work with Peter Nekrasov, Tristan Goodwill, Jeremy Hoskins (U. Chicago), and Travis Askham (NJIT).

Venue : Nambu Discussion Room
Zoom Link: https://icts-res-in.zoom.us/j/98671209268?pwd=QsI1j5WzJiRTb5GJYfAFZaYdk2MQax.1
Meeting ID: 986 7120 9268
Passcode: 203040