THE SECOND SAUDI INTERNATIONAL CONFERENCE ON NUCLEAR POWER ENGINEERING (SCOPE-2)

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# Development of a Buoyancy-Driven Incompressible Schrodinger Flow Algorithm for Inviscid Flows

*Tuesday, 4 November 2025 11:00 (15 minutes)*

This paper presents an extension of the Incompressible Schrödinger Flow (ISF) method for computational analysis of inviscid fluid flows. The ISF method represents an alternative computational approach to traditional Computational Fluid Dynamics (CFD) and spectral methods for inviscid fluid analysis. The fundamental concept exploits the mathematical analogy between hydrodynamics and quantum mechanics, which was initially proposed by Madelung in 1927. This approach transforms the non-linear hyperbolic Euler equations into a linear complex partial differential equation based on the Schrödinger equation. This research contributes to developing quantum-inspired computational methods for fluid dynamics, offering potential advantages in terms of computational efficiency and numerical stability for specific classes of inviscid flow problems.

## Technical Track

Nuclear Thermal-Hydraulics

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