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Exploring Fluid Dynamics: Simulation of Navier-Stokes Equation in a Rotating Cylinder using Finite Difference Method

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Understanding the intricate dynamics of fluid flow in rotating environments is crucial in various scientific and engineering fields, from meteorology to aerospace engineering. In this study, we delve into the simulation of the Navier-Stokes equation within a rotating cylinder using the finite difference method. The Navier-Stokes equation serves as the fundamental governing equation for fluid flow, encompassing the conservation of mass and momentum.

The rotational aspect introduces complexities that significantly influence the flow patterns and behaviors within the cylinder. Through computational simulations, we explore the effects of rotation on fluid motion. The finite difference method provides a numerical framework for discretizing the Navier-Stokes equation, enabling us to solve for the velocity field within the rotating cylinder. The important aspect of the work is the art of simplification within a framework of fluid dynamics.

Field

Physics and Astronomy

Length

Short 15 min

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