



## Special issue on PDE models and computation: part IV

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This issue comprises four research articles addressing different important and challenging mathematical problems. The first one being a semi-analytical approach to sloshing in an immiscible, incompressible and inviscid two-layer fluid. Understanding sloshing through a mathematical framework is challenging. This article presents a useful and computationally viable approach. Next is a numerical compact differencing scheme based on full multi-grid method for the solution of the Neumann Poisson problem which in turn addresses the simulation of the incompressible Navier–Stokes equations. At every time step, one needs to solve the Neumann Poisson problem for pressure

which is the major time consuming part in the entire simulation and that aspect has been addressed through an efficient full multi-grid approach.

The third article on the problem of bifurcating flow through sudden expansions is rather complex. It has been dealt through a conventional CFD approach and the Lattice Boltzmann method in order to understand the effect of divergence and geometric asymmetry. A new non-conforming streamline diffusion finite element method for the approximation of convection dominated diffusion problem, with a thorough numerical analysis, is the final article of this issue.

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