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An efficient, high-order method for solving Poisson equation for immersed boundaries:
Combination of compact difference and multiscale multigrid methods

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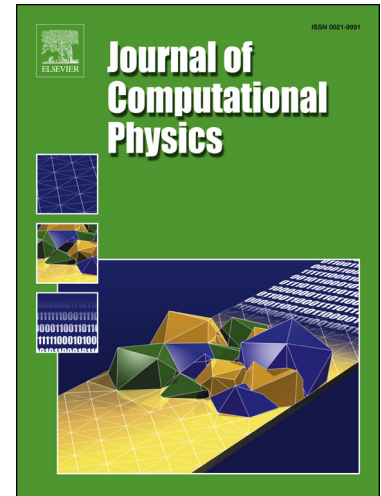
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Highlights

- Development of an efficient, sharp-interface and high-order method to solve the two-dimensional Poisson equation on non-uniform grids with immersed boundaries.
- Achieving a uniformly fourth-order-accurate finite-difference algorithm on an irregularly shaped boundary.
- Designing an efficient and cost-effective solution strategy based on a multiscale multigrid method which easily and efficiently accommodates the irregular immersed boundaries.

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