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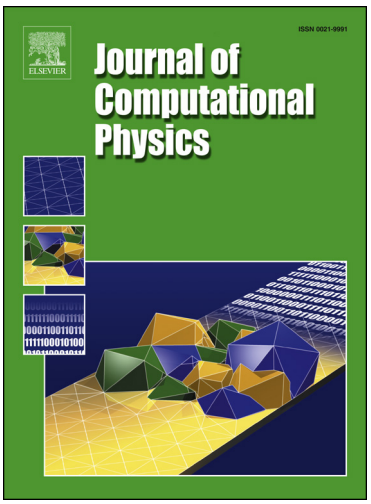

A consistent and conservative immersed boundary method for MHD flows and moving boundary problems

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Highlights

- A consistent and conservative immersed boundary method has been developed to accurately and efficiently solve two topics of magnetohydrodynamics flows with a complex boundary and moving boundary problems.
- A consistent and conservative scheme is implemented to satisfy both the charge and mass conservation laws on cells around the immersed surface, and a conservative interpolation is reconstructed for velocity in moving boundary problems.
- The applied numerical method is validated by stationary and moving boundary cases with good accuracy, efficiency and conservation. Especially, the consistent and conservative immersed boundary method can obtain almost the same accurate results as those from the cut cell technique (J.H. Seo, R. Mittal, J. Comp. Phys. 230 (2011) 7347–7363) for a moving boundary problem by reducing the spurious pressure.