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Finite difference schemes with transferable interfaces for parabolic problems

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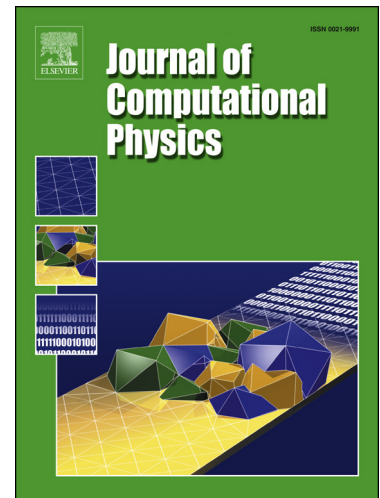
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Highlights

- The derivation is based on summation-by-parts (SBP) operators, which are connected at interfaces using simultaneous-approximation-terms (SAT). Characterizing for the SAT interface treatment, is that it has free penalty parameters that are used to stabilize the scheme, and that the numerical solution have a double representation at the interface. The numerical solutions on both sides of the interface differ slightly.
- We merge the double representation at the SAT interface into a single representation, giving us a new family of operators approximating the second derivative. This is the main result in this paper.
- We show that the new operators preserve the properties of the original SBP-SAT operators, which are stability, accuracy and dual consistency. The resulting operators have the same overall accuracy as the included SBP operator with the lowest order of accuracy.
- The theoretical results are verified by numerical experiments on the Poisson equation and on the steady advection-diffusion equation.

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