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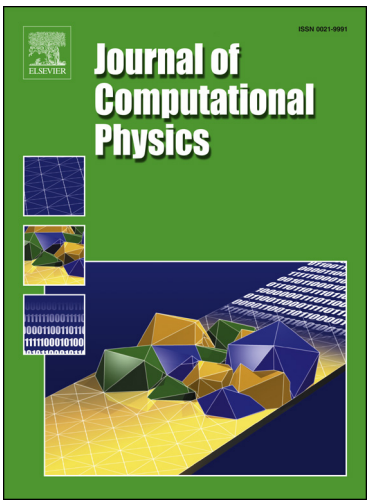

Impact and importance of hyperdiffusion on the spectral element method: A linear dispersion analysis

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Highlights

- Hyperdiffusion for SEM improves the dispersive properties of discrete wave modes.
- The KG53 scheme with time-split diffusion is the most efficient method investigated.
- With hyperdiffusion, SEM is physically consistent for waves longer than $3\Delta x$.
- Scalar and/or divergence damping is effective at eliminating the spectral gap in 2D.
- Analysis routines for SEM with hyperdiffusion have been developed for public use.