

cases	doc_1		doc_2		decision	id
	authors	<ul style="list-style-type: none">Tarik DzanicFreddie D. Witherden			DUPLICATES	962
	title	Positivity-preserving entropy filtering for the ideal magnetohydrodynamics equations	authors	<ul style="list-style-type: none">Tarik DzanicF. Witherden		
	publication_date	2023-01-09 00:48:54+00:00	title	Positivity-preserving entropy filtering for the ideal magnetohydrodynamics equations		
	source	SupportedSources.ARXIV	publication_date	2023-01-09 00:00:00		
	journal	None	source	SupportedSources.SEMANTIC_SCHOLAR		
	volume		journal	ArXiv		
	doi		volume	abs/2301.03129		
	urls	<ul style="list-style-type: none">http://arxiv.org/pdf/2301.03129v1http://arxiv.org/abs/2301.03129v1http://arxiv.org/pdf/2301.03129v1	doi	10.48550/arXiv.2301.03129		
	id	id8146289872461904771	urls	<ul style="list-style-type: none">https://www.semanticscholar.org/paper/c041e03309c46e8a17f4f411911f3f1e499a0cf8		
	abstract	In this work, we present a positivity-preserving adaptive filtering approach for discontinuous spectral element approximations of the ideal magnetohydrodynamics equations. This approach combines the entropy filtering method (Dzanic and Witherden, J. Comput. Phys., 468, 2022) for shock capturing in gas dynamics along with the eight-wave method for enforcing a divergence-free magnetic field. Due to the inclusion of non-conservative source terms, an operator-splitting approach is introduced to guarantee that the positivity and entropy constraints remain satisfied by the discrete solution. Furthermore, a computationally efficient algorithm for solving the optimization process for this nonlinear filtering approach is presented. The resulting scheme can robustly resolve strong discontinuities on general unstructured grids without tunable parameters while recovering high-order accuracy for smooth solutions. The efficacy of the scheme is shown in numerical experiments on various problems including extremely magnetized blast waves and three-dimensional magnetohydrodynamic instabilities.	id	id1193843321373785412		
			abstract	In this work, we present a positivity-preserving adaptive filtering approach for discontinuous spectral element approximations of the ideal magnetohydrodynamics equations. This approach combines the entropy filtering method (Dzanic and Witherden, J. Comput. Phys. , 468, 2022) for shock capturing in gas dynamics along with the eight-wave method for enforcing a divergence-free magnetic field. Due to the inclusion of non-conservative source terms, an operator-splitting approach is introduced to guarantee that the positivity and entropy constraints remain satisfied by the discrete solution. Furthermore, a computationally efficient algorithm for solving the optimization process for this nonlinear filtering approach is presented. The resulting scheme can robustly resolve strong discontinuities on general unstructured grids without tunable parameters while recovering high-order accuracy for smooth solutions. The efficacy of the scheme is shown in numerical experiments on various problems including extremely magnetized blast waves and three-dimensional magnetohydrodynamic instabilities.		
	versions		versions			