cases	doc_1		doc_2		decision	id
			authors	• Marvin Bohm • Sven Schermeng • Andrew R. Winters • Gregor J. Gassner • Gustaaf B. Jacobs	DUPLICATES	1002
	authors	• M. Bohm • Sven Schermeng • A. R. Winters • G. Gassner • G. Jacobs	**title**	Multi-element SIAC filter for shock capturing applied to high-order discontinuous Galerkin spectral element methods		
	title	Multi-element SIAC Filter for Shock Capturing Applied to High-Order Discontinuous Galerkin Spectral Element Methods	**publication_date**	2019-07-10 21:52:34+00:00		
	publication_date	2019-07-10 00:00:00	**source**	SupportedSources.ARXIV		
	source	SupportedSources.SEMANTIC_SCHOLAR	**journal**	None		
	journal	Journal of Scientific Computing	**volume**			
	volume	81	**doi**			
	doi	10.1007/s10915-019-01036-8	**urls**	• http://arxiv.org/pdf/1907.04939v1 • http://arxiv.org/abs/1907.04939v1 • http://arxiv.org/pdf/1907.04939v1		
	urls	• https://www.semanticscholar.org/paper/45b1b0db710b2a65a7783208a86cf0fa1854ecff	**id**	id-5217852009110536191		
	id	id4134981793000971912	**abstract**	We build a multi-element variant of the smoothness increasing accuracy conserving (SIAC) shock capturing technique proposed for single element spectral methods by Wissink et al. (B.W. Wissink, G.B. Jacobs, J.K. Ryan, W.S. Don, and E.T.A. van der Weide. Shock regularization with smoothness-increasing accuracy-conserving Dirac-delta polynomial kernels. Journal of Scientific Computing, 77:579--596, 2018). In particular, the baseline scheme of our method is the nodal discontinuous Galerkin spectral element method (DGSEM) for approximating the solution of systems of conservation laws. It is well known that high-order methods generate spurious oscillations near discontinuities which can develop in the solution for nonlinear problems, even when the initial data is smooth. We propose a novel multi-element SIAC filtering technique applied to the DGSEM as a shock capturing method. We design the SIAC filtering such that the numerical scheme remains high-order accurate and that the shock capturing is applied adaptively throughout the domain. The shock capturing method is derived for general systems of conservation laws. We apply the novel SIAC filter to the two-dimensional Euler and ideal magnetohydrodynamics (MHD) equations to several standard test problems with a variety of boundary conditions.		
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