Abstract Submitted
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CoreSVM: a generalized high-order spectral volume method bearing Conservative Order RElease[1] RAPHAEL LAMOUROUX, JEREMIE GRESSIER, LAURENT JOLY, GILLES GRONDIN, None — The spectral volume method (SVM) introduced by Wang in 2002 is based on a compact polynomial reconstruction where the interpolation's degree is driven by the partition of the spectral volumes. We propose a generalization of the SVM which releases the polynomial degree from this constraint and more importantly that allows to resort to any polynomial order inferior to the regular stencil order without changing the original spectral volume partition. Using one-dimensional advection and Burgers equation, we prove that the proposed extended method exhibits versatile high-order convergence together with conservativity properties. This new method is thus named the CoreSVM for Conservative Order-REleased SVM and we therefore explore its potential towards the numerical simulation of stiff problems. It is stressed that CoreSVM is indeed particularly suited to handle discontinuities, as the order-reduction serves to damp the numerical oscillations due to Runge's phenomenon. To ensure computational stability, local p-coarsening is used to obtain the highest adequate polynomial degree. It is advocated finally that, since the CoreSVM sets the polynomial order adaptation free from any stencil changes, these features do not come at the expense of any extra remeshing or data adaptation cost.

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