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A GENERALIZED FLUX CORRECTION FOR CONTINUOUS-FEM IN ADVECTIVE TRANSPORT

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Summary. Sign–preservation is essential for an algorithm to avoid unphysical computed values of a positive definite property transported by a fluid flow. Furthermore, this feature is beneficial to shrink the oscillatory behavior of the scheme, particularly when values of the advected field are near zero, as, for instance, when null total height of water determines the position of a coastline.

This work presents a sign–preserving continuous finite element model (NFEM) for advection, incorporating an enhanced flux corrected transport method (FCT) with a high order solution founded in the characteristic based FEM. The method extends the inherent correction process of the FCT[1] by assuming a general predictor–type positive solution that allows the inclusion of precedent discarded contributions. Extensive numerical tests demonstrate an approximate conservation of accuracy of the high order FEM scheme once the complete procedure is operating, and the efficacy of the method by comparing results with some successful models. In this communication, numerical experiments concentrate on comparisons of the iterative NFEM with original NFEM for smooth transient problems and for discontinuous problems.

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