

Edge adaptive schemes and machine learning for high-accuracy finite volume schemes

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Edge-adapted methods have been introduced in the context of image processing [1] to reconstruct high resolution images from coarser cell averages. In this work we add this techniques as a building block of a finite volume solver to gain in accuracy and avoid numerical dissipation, when the transported solution is a piece-wise smooth function that is in principle not well captured by the averaged values over a coarse grid. We compare this algebraic approach to that introduced in [3] as well as to learning-based methods [2] in which an artificial neural network (NN) (or in principle any other non linear sufficiently rich function family) is used to attain the same goal.

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- [3] J. E. Pilliod, E. G. Puckett. *Second-order accurate volume-of-fluid algorithms for tracking material interfaces*. Journal of Computational Physics, **199**(2), 465–502, 2004. doi : 10.1016/j.jcp.2003.12.023.