

# Multi-Step Schemes with Finite Volume Method on Unstructured Grids

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**Key words:** *High order schemes, Finite volume method, Unstructured grids, p-adaptation*

In this paper, a multi-step reconstruction method for the high order finite volume schemes on the unstructured grids is proposed. The proposed procedure is a recursive algorithm that can achieve high order accuracy on a compact stencil. The key technique of this procedure is to retain the unknown high order terms in a lower order reconstruction and to use the resulting relations on the present and face-neighboring cells to formulate the equations for higher order reconstructions. Using this technique recursively, we can eventually increase the order of accuracy of the reconstructions in a multi-step procedure on a compact stencil. In the present paper, the third and fourth order schemes are constructed and tested.

This method is ideal for the p-adaptation procedure since high order reconstruction is obtained from lower order reconstructions. Therefore, the p-adaptation procedure is also studied and a significant reduction of the computational cost is achieved.