Wave propagation and wave breaking using adaptive mesh refinement method and coupled models

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In the waves propagation and waves breaking context, efficient numerical methods are necessary to simulate multi scale events. Such numerical modelization is always a compromise between numerical accuracy, physical model's relevance and computational cost. One way to reduce the computational cost is to use an adaptive mesh refinement method on unstructured meshes. The adaptive mesh refinement method follows a block-based decomposition [2,3,5], which allows quick meshing and easy parallelization. The mesh refinement parameter, based for example on the numerical entropy production, benefits of an automatic thresholding which allows to determine appropriated mesh refinement parameters. This approach is used here with a finite volume scheme solving the multi-dimensional Saint-Venant system [4,6] and isothermal bi-fluid Euler system [1]. We propose also a method to couple in a two way nesting approach those two models.

References

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