HIGHER ORDER METHODS FOR TURBULENT AIR/WATER FLOW INTERACTING WITH MOVING STRUCTURES

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We presents a formulation for free-surface computations capable of handling complex phenomena, such as wave breaking and moving rigid bodies, without excessive mass loss or smearing of the interface. The formulation is suitable for discretizations using finite elements of any topology and order, or other approaches such as isogeometric and finite volume methods. Furthermore, the approach builds on s tandard level set tools and can therefore be used to augment existing implementations of level set methods with discrete conservation properties. Implementations of the method are tested on several difficult two- and three-dimensional problems, including two incompressible air/water flow problems with available experimental results. Linear and quadratic approximations on unstructured tetrahedral and trilinear approximations on hexahedral meshes were tested. Global conservation and agreement with experiments as well as computations by other researchers are obtained.