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MESHLESS SHAPES AND A MESHLESS FRONT TRACKING METHOD

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Abstract. The representation of interfaces by means of the Algebraic Moving-Least-Squares (AMLS) technique is addressed. This technique, in which the interface is represented by an unconnected set of points, is interesting for evolving fluid interfaces since there is no surface connectivity. The position of the surface points can thus be updated without concerns about the quality of the surface triangulation.

Based on a new AMLS technique of improved robustness, we propose a front-tracking method based on the Lagrangian advection of the unconnected point set that defines the interface. The advection of the point set makes the surface evolve in time. The points can be regenerated at any time (in particular, we regenerate them each time step) by intersecting the gridlines of the fluid solver with the evolved surface. This guarantees that the density of points on the surface is always well balanced and allows for the treatment of topological changes. Several examples of interface transport show the potential of the method.