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Large eddy simulation on deforming unstructured meshes using Lagrangian subgrid-scale model REED CUMMINGS, ONKAR SAHNI, STEVEN TRAN, RPI — Large eddy simulation (LES) provides a high fidelity alternative to direct numerical simulation (DNS) in which computational costs are significantly reduced. LES resolves the large-scale turbulent structures present in the flow while modeling the effect of the unresolved or subgrid scales on resolved scales. The Smagorinksy-based LES approach uses an eddy viscosity to model the unresolved stresses. These models rely on a parameter to calculate the eddy viscosity. For complex flows this parameter varies with space and time, thus dynamic procedures are required to determine the parameter. Additionally, many flows problems of interest involve moving geometries or deforming domains for which appropriate dynamic procedure is required. This work employs the Lagrangian subgrid-scale model within an arbitrary Lagrangian Eulerian (ALE) formulation involving deforming unstructured meshes. Two cases will be studied including flow through a channel and flow over an airfoil.

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