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Dynamic Lagrangian model for LES on unstructured grids KRISHNAN MAHESH, AMAN VERMA, University of Minnesota — We discuss a dynamic Lagrangian averaging approach applied in conjunction with the dynamic model for large-eddy simulation. Unlike Meneveau's Lagrangian dynamic model where the Lagrangian time scale contains an adjustable parameter θ, we propose a dynamic time scale based on a "surrogate-correlation" of the Germano-identity error (GIE). Also, a simple material derivative relation is used to calculate GIE at different events along a pathline instead of Lagrangian tracking. The absence of any multi-linear interpolation makes this approach particularly suitable for unstructured grids. The proposed model is applied to LES of turbulent channel flow at various Reynolds numbers and grid resolutions. Significant improvement over the dynamic Smagorinsky model is observed, especially at coarse resolutions. The model is also applied to external flow over a cylinder at high Reynolds numbers. This work was supported by the United States Office of Naval Research under ONR Grant N00014-08-1-0433.

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