Abstract Submitted
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An intermittency model for predicting roughness induced transition[1] XUAN GE, PAUL DURBIN, Iowa State University — An extended model for roughness-induced transition is proposed based on an intermittency transport equation for RANS modeling formulated in local variables. To predict roughness effects in the fully turbulent boundary layer, published boundary conditions for k and ω are used, which depend on the equivalent sand grain roughness height, and account for the effective displacement of wall distance origin. Similarly in our approach, wall distance in the transition model for smooth surfaces is modified by an effective origin, which depends on roughness. Flat plate test cases are computed to show that the proposed model is able to predict the transition onset in agreement with a data correlation of transition location versus roughness height, Reynolds number, and inlet turbulence intensity. Experimental data for a turbine cascade are compared with the predicted results to validate the applicability of the proposed model.

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