Abstract Submitted for the DFD16 Meeting of The American Physical Society

Flamelet Regime Diagram for Turbulent Combustion Simulations WAI LEE CHAN, MATTHIAS IHME, Stanford University, HEMANTH KOLLA, JACQUELINE CHEN, Sandia National Laboratories — The flamelet model has been widely used in numerical combustion investigations, particularly for the closure of large-eddy simulations (LES) of turbulent reacting flows. In most cases, the simulation results demonstrated good agreements with their experimental counterparts. However, a systematic analysis of the flamelet model's applicability, as well as its potential limitations, is seldom conducted, and the model performance is usually based only on *a-posteriori* comparisons. The objective of this work is to derive a metric that can formally quantify the suitability of the flamelet model in different flame configurations. For this purpose, a flamelet regime diagram has been developed and studied in the context of direct numerical simulations (DNS) of a turbulent lifted jet flame. The implementation of the regime diagram in LES has been investigated through explicit filtering of the DNS results.

> Wai Lee Chan Stanford Univ

Date submitted: 01 Aug 2016

Electronic form version 1.4