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Pareto-optimal modeling of autoignition in a turbulent methane jet-in-hot-coflow configuration QUENTIN DOUASBIN, Center for Turbulence Research, Stanford University, Stanford, CA 94305, United States, MATTHIAS IHME, Department of Mechanical Engineering, Stanford University, Stanford, CA 94305, United States — Autoignition plays a key role in several industrial applications. Modeling such flame regimes is challenging as they exhibit multi-mode combustion. The Pareto-efficient Combustion (PEC) framework was developed to model multi-mode combustion by assessing the compliance of combustion models to the underlying flow physics by means of a drift term. To model this transient ignition regime, the PEC-framework is extended by considering the ignition as a process quantity. The resulting PEC-formulation is applied to simulations of ignition in a jet-in-hot-coflow burner and two combustion sub-models are considered: Finite-Rate Chemistry (FRC) and steady flamelet (FPV). It is shown that a monolithic FPV-model significantly mispredicts the flame lift-off and ignition time. The novel PEC-formulation is able to accurately capture the flame stabilization and autoignition time, resulting in comparable accuracy to that of a monolithic FRC simulation; however, as reduction of the computational cost in excess of 60

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