

Abstract Submitted
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Principal Component Transport in Turbulent Combustion¹

TAREK ECHEKKI, HESSAM MIRGOLBABAIEI, North Carolina State University — We present a posteriori validation of the solution of a turbulent combustion problem based on the transport of principal components (PCs). The PCs are derived from a priori principal component analysis (PCA) of the same composition space. This analysis is used to construct and tabulate the PCs' chemical source terms and diffusion coefficients in terms of the PCs using artificial neural networks (ANN). The a posteriori validation is implemented on a stand-alone one-dimensional turbulence (ODT) simulation of Sandia flame F resulting in a very good reconstruction of the original thermo-chemical scalars profiles at different downstream distances.

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