

Machine learning in turbulent reactive flow simulations

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Abstract

The recent revolution of deep learning has completely transformed lots of complex problems in computer vision and natural language processing. And it has opened up new opportunities for efficient high-fidelity turbulent combustion simulations. This presentation will focus on discussing the potential use of machine learning in some aspects of physical modeling and computational acceleration for turbulent flame simulations. Specific examples include the use of machine learning for data driven mechanism optimization, identification of local flame features/combustion modes, efficient evaluation of the nonlinear reaction mapping, and exploring the intrinsic active subspace in uncertainty quantification.