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Recent advances in Lattice-Boltzmann modeling of reactive flows

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[1] Aix Marseille Univ, CNRS, Centrale Med, M2P2, Marseille, France. Recent progress in Lattice-Boltzmann numerical schemes [1] has led to a large number of successful applications in the field of reactive flows.
An overview of these applications for combustion will be presented, from DNS to large eddy simulations, showing that LBM is now validated and mature for most configurations involving gaseous combustion.
In particular, the ability of the method to accurately transport acoustic waves and thus predict thermoacoustic instabilities will be stressed [2, 3]. Stability and conservativity will be showcased by studying detonations [4]. A Lattice-Boltzmann compatible radiation model will also be presented. Finally, a large-eddy simulation of a large industrial burner will be presented, validated with experimental data.

References

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