Abstract Submitted
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Maximum Entropy of Effective Reaction Theory of Steady Non-ideal Detonation[1] SIMON WATT, University of Leeds, MARTIN BRAITHWAITE, Imperial College, WILLIAM BYERS BROWN, Manchester University, SAMUEL FALLE, GARY SHARPE, University of Leeds — According to the theory of Byers Brown, in a steady state detonation the entropy production between the shock and sonic locus is a maximum in a self-sustaining wave. This has shown to hold true for all one-dimensional cases. Applied to 2D steady curved detonation waves in a slab or cylindrical stick of explosive, Byers Brown suggested a novel variational approach for maximising the global entropy generation within the detonation driving zone, hence providing the solution of the self-sustaining detonation wave problem. Preliminary application of such a variational technique, albeit with simplfying assumptions, demonstrate its potential to provide a rapid and accurate solution method for the problem. In this paper, recent progress in the development of the 2D variational technique and validation of the maximum entropy concept are reported. The predictions of the theory are compared with high-resolution numerical simulations and with the predictions of existing Detonation Shock Dynamics theory.

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