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Theory of weakly nonlinear self sustained detonations LUIZ
FARIA, ASLAN KASIMOV, KAUST, RODOLFO ROSALES, MIT — We derive a
new weakly non-linear asymptotic model of detonation waves capable of capturing
the rich dynamics observed in solutions of the reactive Euler equations, both in one
and multiple space dimensions. We then investigate the travelling wave solutions
of the asymptotic model, together with their linear stability. Finally, we study the
non-linear dynamics through numerical simulations, and present a quantitative comparison between the asymptotic equations and the full system they are expected to
approximate.

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