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Thermo-mechanics modeling and physics DAVID KASSOY, Kassoy Innovative Science Solutions LLC, ADAM NORRIS, University of Colorado, Boulder — Thermal energy deposition into a finite volume of gas is the immediate source of thermodynamic and velocity disturbances. The thermo-mechanical response in a given geometry and system depends on a variety of physical parameters including the time scale and quantity of heat deposition into the volume, and on the time scale that characterizes acoustic disturbances in the volume. Thermo-mechanical modelling is based on the **non-dimensional** reactive Navier-Stokes equations. The relevant **non-dimensional** parameters include: \parda. ; the ratio of the characteristic time scale for heat release to the acoustic time scale of the volume, **. $q_{R:}$: the ratio of the characteristic heat of reaction to the initial internal energy level in the volume, . : the traditionally defined high activation parameter.\pardNumerical results, based on the reactive Euler equations, are described for a wide range of non-dimensional** parameters defined above. They are compared with asymptotic analytical results, obtained for a variety of limiting parameter values, that including non-intuitive nearly constant volume, nearly isobaric and fully compressible responses to energy deposition.

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