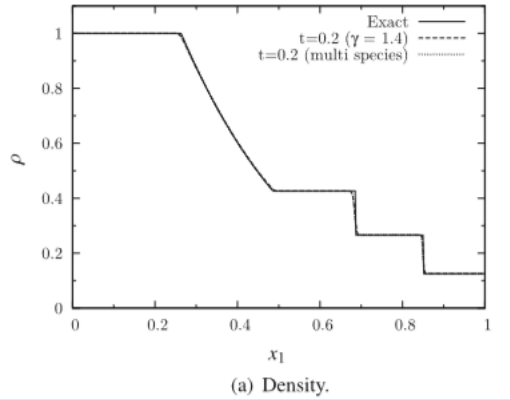
Field	Example
Verification type	Analytical Solutions
Database reference	ANA-1
Topic / Application	Sod's Shock Tube Laminar Premixed Flame DNS LES
Physics	Compressible reactive flows. Combustion Detonations Supersonic
Summary	Extensive case verification of a highly accurate solver with applications in compressible flows with combustion.
Description	The paper verifies a numerical solver via series of numerical verification subsets including: the standard Sod's shock tube problem, the convection of an isentropic vortex, the propagation of a one-dimensional acoustic wave, a multicomponent Riemann shock tube problem, the one-dimensional but multicomponent unsteady diffusion of a smooth concentration profile, a perfectly stirred reactor problem, the ignition sequence of a multicomponent mixture in a shock tube, and a one-dimensional laminar premixed flame. The paper also describes the implementation of the spatial discretisation scheme which is formally high order but can reduce to a more stable and diffusive form in regions of discontinuities/shocks.
Case Title	A detailed verification procedure for compressible reactive multicomponent Navier–Stokes solvers
Authors	*Ferrer, P.J, Buttay R., Lehnasch G, Mur A.*
Year	2014
Online reference	Computers & Fluids 89 (2014) 88–110
Case image	 (a) Density. Example of Sod's shock tube, computational and exact solution
Governing equations	
Results	The NS solver was verified by considering a well-chosen series of elementary numerical benchmarks suited to the multicomponent compressible and reactive flow fields of

	interest. The obtained results are satisfactorily compared with available data and solutions of reference. Moreover, the paper provides detailed procedure of numerical verification for the scientific community concerned with the numerical simulation of such complex flow fields.