### Verification type
Analytical Solutions

### Database reference
ANA-2

### Topic / Application
Hydrogen LES

### Physics
Detonation

### Summary
Authors use LES to simulate hydrogen-air detonation. The solution is verified against a simplified /analytical model (ZND).

### Description
A large eddy simulation (LES) model of hydrogen–air detonation at very large scales, is presented. The LES model is verified against theoretical solution by the Zel'dovich–von Neumann–Doring (ZND) theory for a case of planar 29.05\% hydrogen–air detonation in elongated 3 x 3 x 100 m calculation domain.

A Riemann problem (RP) is also simulated as it gives an exact solution to non-linear equations like the Euler equations.

The numerical simulation reproduced theoretical values of von Neumann spike, Chapman–Jouguet pressure, Taylor wave and detonation propagation velocity.

### Case Title
LES Model of Large Scale hydrogen-air planar detonations; verification by the ZND theory

### Authors
Zibrowski, M. Marakov, D. Volkov, M.

### Year
2008

### Online reference

### Case image
Comparison between analytical solution and numerical simulation of the Riemann problem

---

The SUSANA project is co-funded by the European Commission within the 7\(^{th}\) Framework Program

Grant agreement no.: FCH-JU-325386
### Governing equations

### Results

The SUSANA project is co-funded by the European Commission within the 7th Framework Program

Grant agreement no.: FCH-JU-325386