Poster at Splinter Meeting

Splinter L

Self-similar solutions of isothermal shocktubes

S. C. Deschner[1], T. F. Illenseer[1], W. J. Duschl[1,2]

[1] *ITAP, Christian-Albrechts-Universität zu Kiel*
[2] *Steward Observatory, The University of Arizona*

We investigate solutions for isothermal shock problems in different one dimensional geometries. The solutions are calculated with well known exact numerical solvers and, moreover, we are able to give analytical expressions for special cases.

We use the method of self-similar solutions defining a parameter $\kappa \geq 0$ which reduces all possible solutions due to the initial density distribution $\Sigma(r,t) \propto r^{-\kappa}$. This points together with different geometries to a wide range of applications like spherical collapses, simple shocktubes or point like explosions.

Together with the Rankine-Hugoniot conditions determining the shock strength, we are able to give unique solutions. These exact analytical solutions allow to test any one dimensional hydrodynamics code, yet with different coordinates and initial density distributions.