

# The Shock Wave Problem Revisited: The Navier-Stokes Equations and Brenner's Modification

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The problem of plane shock waves in dilute gases is briefly reviewed. We show that in appropriate reduced variables the local orbits of the Navier-Stokes equations are independent of the specific temperature dependence of the transport coefficients. Furthermore, they are also locally the same as those obtained by using Holian's conjecture [1]. The asymmetry factor is calculated for different interatomic potentials and comparisons with previous computations is provided. Brenner's modification [2] of the Navier-Stokes equations is considered for the stationary shock wave problem and the results are compared with the non-stationary analysis of reference [3].

## Bibliography

[1] B. L. Holian, C. W. Patterson, M. Mareschal, and E. Salomons, Phys. Rev. E 47, R24 (1993).

[2] H. Brenner, Physica A 349, 11 (2005).

[3] C. J. Greenshields and J. M. Reese, J. Fluid Mech. 580, 407 (2007).