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Similarity solution for variable energy shock waves in a dusty gas under isothermal flow-field condition

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Abstract

The problem of strong shock-wave propagation through a dusty gas is studied as a limiting case of very intensive heat transfer. According to potential law, the variable energy is continuously deposited at the shock front. A self-similar solution is found under isothermal condition of the flow field. The spherical case is worked out in detail to investigate as to how the blast wave is influenced by the energy input as well as by the mass concentration of the solid particles in the medium and the ratio of density of the solid particles to the initial density of the medium. The cases of instantaneous energy input and dust-free gas are both included in the numerical results as limiting cases.

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