Introduction to simple shock waves in air with numerical solutions using artificial viscosity

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Abstrak

This book provides an elementary introduction to some one-dimensional fluid flow problems involving shock waves in air. The differential equations of fluid flow are approximated by finite difference equations and these in turn are numerically integrated in a stepwise manner. Artificial viscosity is introduced into the numerical calculations in order to deal with shocks. The presentation is restricted to the finite-difference approach to solve the coupled differential equations of fluid flow as distinct from finite-volume or finite-element methods. This text presents the results arising from the numerical solution using Mathcad programming. Both plane and spherical shock waves are discussed with particular emphasis on very strong explosive shocks in air.