

Hafez, M. M.; Guo, W. H.

Some anomalies of numerical simulation of shock waves. I: Inviscid flows. II: Effect of artificial and real viscosity. (English) [Zbl 0970.76079](#)

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Summary: In part I, we discuss nonunique solutions of potential and Euler equations. Previous work related to airfoil problem is reviewed, and some new results are presented. Simple models based on Burgers equation and quasi-one-dimensional nozzle flow are examined. We also include an example for a three-dimensional wing admitting nonunique solutions of potential and Euler equations.

Part II deals with shock structure and its limit for conservative and nonconservative formulations. In particular, we calculate the entropy jumps across inviscid shocks using different artificial viscosity forms. The effects of real viscosity for two-dimensional airfoil problems are studied, and nonunique solutions of Navier-Stokes equations for transonic flows are presented for simple symmetric configurations.

MSC:

[76M99](#) Basic methods in fluid mechanics
[76L05](#) Shock waves and blast waves in fluid mechanics
[76H05](#) Transonic flows

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Keywords:

potential equations; nonunique solutions; airfoil problem; Burgers equation; quasi-one-dimensional nozzle flow; three-dimensional wing; Euler equations; shock structure; entropy jumps; artificial viscosity; Navier-Stokes equations; transonic flows

Software:

[OVERFLOW](#)

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