

Preface

The monograph is devoted to modern mathematical models and numerical methods for solving gas- and fluid-dynamic problems based on them. Two interconnected mathematical models generalizing the Navier–Stokes system are presented; they differ from the Navier–Stokes system by additional dissipative terms with a small parameter as a coefficient. The new models are called the quasi-gas-dynamic and quasi-hydrodynamic equations. Based on these equations, effective finite-difference algorithms for calculating viscous nonstationary flows are constructed and examples of numerical computations are presented. The universality, the efficiency, and the exactness of the algorithms constructed are ensured by the fulfillment of integral conservation laws and the theorem on entropy balance for them.

The book is a course of lectures and is intended for scientists and engineers who deal with constructing numerical algorithms and performing practical calculations of gas and fluid flows and also for students and postgraduate students who specialize in numerical gas and fluid dynamics.

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