Preface

Many if not most flow processes of interest for engineering, environmental, and biological systems are of two-phase flow nature or include at least some two-phase flow features. It is therefore not surprising that two-phase flow has reached an enormous attention during the last decades. The great interest in two-phase flow is reflected by the large and continuously growing literature on this subject usually dispersed in various journals and conference proceedings. Books or monographs on two-phase flow are relatively rare and are mostly limited to specific two-phase conditions, flow phenomena, or to dedicated applications.

The purpose of the present monograph on "Gasdynamic Aspects of Two-phase Flow" is to provide a thorough review on wave propagation phenomena in two-component (water/air) and one-component (water/steam) media. The term "Gasdynamic Aspects" is used in a broader sense, covering not only compressibility effects such as sound waves, shock waves, and critical flow conditions rather than including also slow wave modes such as void waves or contact discontinuities propagating with the material velocity of the gas/vapor or liquid phase.

The numerical simulation of the wave propagation processes is based on a newly developed hyperbolic two-fluid model which allows an algebraic evaluation of the complete eigenspace (eigenvalues and related eigenvectors). For the numerical integration of the governing flow equations a second-order Flux Vector Splitting technique is used which allows a high resolution of local flow processes such as steep parameter gradients or flow discontinuities.

For most wave propagation processes investigated, results are also given for single-phase gas or homogeneous two-phase flow before dealing with more complex two-phase flow under heterogeneous and nonequilibrium conditions. Although the major emphasis is on the theoretical approach, experimental data are included where appropriate or available.

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