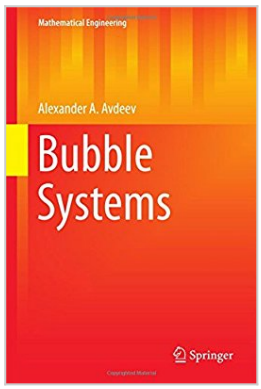

Bubble Systems (Mathematical Engineering)

By Alexander A. Avdeev

Bubble Systems (Mathematical Engineering) By Alexander A. Avdeev

This monograph presents a systematic analysis of bubble system mathematics, using the mechanics of two-phase systems in non-equilibrium as the scope of analysis. The author introduces the thermodynamic foundations of bubble systems, ranging from the fundamental starting points to current research challenges. This book addresses a range of topics, including description methods of multi-phase systems, boundary and initial conditions as well as coupling requirements at the phase boundary. Moreover, it presents a detailed study of the basic problems of bubble dynamics in a liquid mass: growth (dynamically and thermally controlled), collapse, bubble pulsations, bubble rise and breakup. Special emphasis is placed on bubble dynamics in turbulent flows. The analysis results are used to write integral equations governing the rate of vapor generation (condensation) in non-equilibrium flows, thus creating a basis for solving a number of practical problems. This book is the first to present a comprehensive theory of boiling shock with applications to problems of critical discharge and flashing under the fast decompression conditions. Reynolds' analogy was the key to solving a number of problems in subcooled forced-flow boiling, the theoretical results of which led to easy-to-use design formulas. This book is primarily aimed at graduate and post-graduate students specializing in hydrodynamics or heat and mass transfer, as well as research expert focused on two-phase flow. It will also serve as a comprehensive reference book for designers working in the field of power and aerospace technology.

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Editorial Review

Review

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From the Back Cover

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