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BOOK REVIEW

Turbulent Flows in Gas Suspensions, by A. A. SHRAIBER, V. P. YATSENKO, L. B. GAVIN and V. A. NAUMOV (Edited by DOLINSKY, A. A.). Hemisphere, New York (1990). $125.

This book consists of 6 chapters: equations of two-phase turbulent flows; convective transfer of particles; fluctuation motion of particles; models of two-phase turbulent jet flows; numerical study of two-phase turbulent jets; and additional problems of hydrodynamics and heat exchange of gas suspension.

The basic concepts of the authors are presented in Chaps 4 and 5. They are trying to construct a description of two-phase turbulent flows in terms of the k–ϵ model with additional terms connected with the effect of particles on the energy dissipation. The above-mentioned approach is rather questionable:

1. The authors assumed that empirical constants of the single-phase k–ϵ model will not change in the presence of particles and so, the vortex structure of the flow will not change either. However, there is some basic physical evidence that this is not the case.
2. The additional empirical constants are evaluated using experimental data, first of all, for submerged jets. Afterwards, practically all original results of the authors are related with such jets. So the agreement of the experimental results with the results of numerical simulations is not surprising. However, there are no results of simulations of other types of jet flows—wall jets, radial jets, sprinkler jets and so on. So there is no evidence that the proposed description will be valid in other types of jet flows and, moreover, that the additional semiempirical constants will have really constant values in various flows.
3. The proposed description is very complicated as compared with the rather simple physical problems which were considered. It is not clear that this complicated approach will yield better results than the simple mixing length theory modified for the presence of particles on the definite physical base (as had been done, for example, in the work of G. N. Abramovich, which is known to the authors).

In conclusion there is a need to note that the book is overcrowded by simple transformations and descriptions of rather trivial computational details.

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