EDITORIAL

Computational interface tracking techniques are being used to predict ever more complex interfacial behaviour in systems involving deformable interfaces between phases in liquid-liquid, gas-liquid and gas-liquid-liquid multiphase systems. A major problem in assessing such predictions is the fact that specific computational tools are used that cannot be given or even described in detail in publications. How can the validity of the predictions be assured? One approach is to validate the codes against known (and preferably analytical) solutions for well-specified and standard test cases. If the code is able correctly to predict these test cases, then this gives confidence in its ability to predict new cases for which analytical solutions (or experimental data) do not exist.

A major exercise has been carried out under the leadership of Didier Jamet, Olivier Lebaigue and Herve Lemonnier (Associate Editor, MST) with the aim of selecting and specifying a range of test cases for interface tracking methods and we are pleased to present them in this present issue. As will be seen, no less than 33 test cases are presented, each one in sufficient detail to allow explicit use by practitioners. Rather than splitting the material between successive separate issues of MST, we have decided to present all the cases in the present Triple Issue. We believe that this will be not only more convenient for the user but will provide a useful single-source reference and guide for Test Case Codes to be associated henceforth with our Journal, The Multiphase Science and Technology.

The test cases range from simple cases of individual bubble behaviour to more complex cases such as cavitation, solitary waves etc. We make no apology for including simple as well as more complex cases; codes often fail to predict simple systems even when they appear to predict believable answers for more complex ones!

The presentation of test cases for these advanced computational methods continues a tradition of presentation of benchmark cases for computational methods in Multiphase Science and Technology. In the earlier presentations, the emphasis was on numerical and experimental benchmarks for one-dimensional codes and these benchmarks have been widely used in this context. We believe that the test cases presented here will be equally influential in developing multidimensional interface tracking methods. We would like to express our thanks to Drs. Jamet, Lebaigue and Lemonnier and to the many authors involved in this project for their hard work!

The Editors