Contents

Preface vii

A single-cell-based model of multicellular growth using the immersed boundary method
R. Dillon, M. Owen, and K. Painter 1

Numerical simulation of gas bubbles rising in viscous liquids at high Reynolds number
J.-S. Hua, P. Lin, and J. F. Stene 17

A high order finite difference scheme for the Stokes equations
K. Ito and Z. Qiao 35

An efficient γ-model BGK scheme for multicomponent flows on unstructured meshes
S. Jiang and G. Ni 53

An implicit-forcing immersed interface method for the incompressible Navier-Stokes equations
D. V. Le, B. C. Khoo, and Z. Li 73

The nucleation and growth of gas bubbles in a Newtonian fluid: An energetic variational phase field approach
A. Naber, C. Liu, and J. J. Feng 95

Critical fields of liquid crystals
X.-B. Pan 121

The transient motion of buoyant bubbles in a vertical Couette flow
J. Palacios and G. Tryggvason 135

Issues of immersed boundary/continuum methods
X. S. Wang 147

A finite element method for interface problems with locally modified triangulations
H. Xie, K. Ito, Z. Li, and J. Toivanen 179