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Mesoscale description of polydisperse systems""; ""2.1 Number-density functions (NDF)""; ""2.1.1 Length-based NDF""; ""2.1.2 Volume-based NDF""; ""2.1.3 Mass-based NDF""; ""2.1.4 Velocity-based NDF""; ""2.2 The NDF transport equation""; ""2.2.1 The population-balance equation (PBE)""; ""2.2.2 The generalized population-balance equation (GPBE)""; ""2.2.3 The closure problem""; ""2.3 Moment-transport equations""; ""2.3.1 Moment-transport equations for a PBE""; ""2.3.2 Moment-transport equations for a GPBE""
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""4.4 Moment closures for the GPBE""

Sommario/riassunto

Providing a clear description of the theory of polydisperse multiphase flows, with emphasis on the mesoscale modelling approach and its relationship with microscale and macroscale models, this all-inclusive introduction is ideal whether you are working in industry or academia. Theory is linked to practice through discussions of key real-world cases (particle/droplet/bubble coalescence, break-up, nucleation, advection and diffusion and physical- and phase-space), providing valuable experience in simulating systems that can be applied to your own applications. Practical cases of QMOM, DQMOM, CQMOM, EQMOM and ECQMOM are also discussed and compared, as are realizable finite-volume methods. This provides the tools you need to use quadrature-based moment methods, choose from the many available options, and design high-order numerical methods that guarantee realizable moment sets. In addition to the numerous practical examples, MATLAB scripts for several algorithms are also provided, so you can apply the methods described to practical problems straight away.