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RESEARCH PAPERS

用相指示器函数方法(分散元概率密度函数)推导及验证湍流稀两相流动的欧拉-欧拉模型

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摘要 A statistical formalism overcoming some conceptual and practical difficulties arising in existing two- phase flow (2PHF) mathematical modelling has been applied to propose a model for dilute 2PHF turbulent flows. Phase interaction terms with a clear physical meaning enter the equations and the formalism provides some guidelines for the avoidance of closure assumptions or the rational approximation of these terms. Continuous phase averaged continuity, momentum, turbulent kinetic energy and turbulence dissipation rate equations have been rigorously and systematically obtained in a single step. These equations display a structure similar to that for single-phase flows. It is also assumed that dispersed phase dynamics is well described by a probability density function (pdf) equation and Eulerian continuity, momentum and fluctuating kinetic energy equations for the dispersed phase are deduced. An extension of the standard k-ε turbulence model for the continuous phase is used. A gradient transport model is adopted for the dispersed phase fluctuating fluxes of momentum and kinetic energy at the non-colliding, large inertia limit. This model is then used to predict the behaviour of three axisymmetric turbulent jets of air laden with solid particles varying in size and concentration. Qualitative and quantitative numerical predictions compare reasonably well with the three different sets of experimental results, studying the influence of particle size, loading ratio and flow confinement velocity.

关键词 two-phase flow turbulence phase indicator function pdf ensemble average jet
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本刊中 包含“two-phase flow”的 相关文章
本文作者相关文章
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Deduction and Validation of an Eulerian-Eulerian Model forTurbulent Dilute Two-Phase Flows by Means of the Phase Indicator Function-Disperse ElenentsProbability Density Function

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Key words two-phase flow; turbulence; phase indicator function; pdf ensemble average; jet

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