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RESEARCH PAPERS

用扩散流动模型分析悬浮床内的气固两相向上流动

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摘要 A mathematical model of two-dimensional turbulent gas-particle two-phase flow based on the modified diffusion flux model (DFM) and a numerical simulation method to analyze the gas-particle flow structures are developed. The modified diffusion flux model, in which the acceleration due to various forces is taken into account for the calculation of the diffusion velocity of particles, is applicable to the analysis of multi-dimensional gas-particle two-phase turbulent flow. In order to verify its accuracy and efficiency, the numerical simulation by DFM is compared with experimental studies and the prediction by κ-ε-κp two-fluid model, which shows a reasonable agreement. It is confirmed that the modified diffusion flux model is suitable for simulating the multi-dimensional gas-particle two-phase flow.

关键词 diffusion flux model gas-solid two-phase flow turbulent flow numerical simulation

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A Numerical Simulation of Gas-Particle Two-Phase Flow in a Suspension Bed Using Diffusion Flux Model

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Abstract A mathematical model of two-dimensional turbulent gas-particle two-phase flow based on the modified diffusion flux model (DFM) and a numerical simulation method to analyze the gas-particle flow structures are developed. The modified diffusion flux model, in which the acceleration due to various forces is taken into account for the calculation of the diffusion velocity of particles, is applicable to the analysis of multi-dimensional gas-particle two-phase turbulent flow. In order to verify its accuracy and efficiency, the numerical simulation by DFM is compared with experimental studies and the prediction by κ-ε-κp two-fluid model, which shows a reasonable agreement. It is confirmed that the modified diffusion flux model is suitable for simulating the multi-dimensional gas-particle two-phase flow.

Key words diffusion flux model; gas-solid two-phase flow; turbulent flow; numerical simulation

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