

RESEARCH PAPERS

混沌混合中流体指数拉伸与混合效率的数值研究

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摘要 The stretching and folding of fluid element during chaotic mixing field is studied using numerical method. The chaotic mixing process is caused by periodic secondary flow in a twisted curved pipe. Using the nonlinear discrete velocity field as the dynamical system, the present study connects the fluid particle's stretching along its trajectory in one period to a linearized time-varying variational equation. After numerical approximation of the variational equation, fluid stretching is calculated on the whole cross section. The stretching distribution shows an exponential fluid stretching and folding, which indicates an excellent mixing performance.

关键词 [chaotic mixing](#) [secondary flow](#) [numerical approximation](#)

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Numerical Investigation on Mixing Efficiency and Exponential Fluid Stretching in Chaotic Mixing

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Abstract The stretching and folding of fluid element during chaotic mixing field is studied using numerical method. The chaotic mixing process is caused by periodic secondary flow in a twisted curved pipe. Using the nonlinear discrete velocity field as the dynamical system, the present study connects the fluid particle's stretching along its trajectory in one period to a linearized time-varying variational equation. After numerical approximation of the variational equation, fluid stretching is calculated on the whole cross section. The stretching distribution shows an exponential fluid stretching and folding, which indicates an excellent mixing performance.

Key words [chaotic mixing](#); [secondary flow](#); [numerical approximation](#)

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