

عنوان مقاله:

Numerical study of drag reduction using micro bubbles in a vertical Couette-Taylor system

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خلاصه مقاله:

This work focuses on studying the drag reduction due to the presence of micro-bubbles in a vertical Couette-Taylor system. The study was carried out numerically using a discrete phase model for a fully turbulent flow, which maximum Re_w is up to 3000. Main flow is water and the airbubbles are injected constantly at the bottom of cylinder and rise through the flow. At the first step the bubbles distribution or bubbles pattern through the flow, that is acquired using numerical method, shows a good agreement with those found via the experimental data for all Reynolds numbers. The effect of injected air with constant flow rate on the drag reduction was studied using variation of friction coefficient which was calculated by the variation of shear stress on the cylinder surface. The results confirmed about 25% of drag reduction when micro bubbles were injected in the system. This reduction was the effect of the bubbles on the density of fluid and transformed momentum. Moreover, the acquired numerical results were in good agreement to those found in the previous experimental works

کلمات کلیدی:

Micro bubbles, Friction drag, Drag reduction, Couette-Taylor system, Discrete phase model

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