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Measurements of the fluctuating liquid velocity of a bidisperse suspension of bubbles rising in a vertical channel JUAN CARLOS SERRANO, SANTOS MENDEZ, ROBERTO ZENIT, Universidad Nacional Autonoma de Mexico — Experiments were performed in a vertical channel to study the behaviour of a bidisperse suspension of bubbles. Bubbles were produced using capillaries of two distinct inner diameters. The capillaries are small enough to generate bubbles in the range of 1 to 6 mm in diameter. Using water and water-glycerin mixtures, the vertical component of the fluctuating liquid velocity was obtained using a flying hot wire anemometer technique. The system is characterized by the dimensionless Reynolds and Weber numbers in the range of $22 < Re < 890$ and $0.2 < We < 2.9$, respectively. The gas volume fraction ranges between 0.5% and 6%. The measurements were obtained for three ratios R of gas volume fraction: R = 1/3, 1 and 3, where $R = \alpha_{large}/\alpha_{small}$. The results show that the flow agitation, characterized by the liquid velocity variance increases with bubble concentration. We also found that the variance, normalized with the mean bubble velocity squared, $T_f = U_f'^2/U_b^2$, increased as the Reynolds number decreased. Bidisperse flows, in general, show larger values of fluctuation.

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