EFFECT OF BROWNIAN DIFFUSION AND VOLUME FRACTION ON PERTURBATION PARTICLE VELOCITY OF AXIALLY SYMMETRICAL JET MIXING INCOMPRESSIBLE DUSTY FLUID

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Abstract

Effect of Brownian diffusion and volume fraction on perturbation particle velocity of axially symmetrical jet mixing incompressible dusty fluid has been studied. Assuming the velocity and temperature in the jet to differ only slightly from that of the surrounding stream, a perturbation method has been employed to linearize the basic differential equations. The linearized boundary layer equations have been solved by using Crank Nicholson finite difference technique. Numerical computations have been made to discuss the profiles of longitudinal perturbation particle velocity and profiles of transverse perturbation particle velocity. Consideration of Brownian diffusion helps in migration of particles through a longer distance and decrease the magnitude of velocity of the particles considerably which helps in settling of suspended particulate matter.

Keywords : Particulate suspension, Boundary layer characteristics, diffusion, Incompressible, dusty fluid, volume fraction, Brownian diffusion.