

NUMERICAL SOLUTION OF AXI SYMMETRIC JET MIXING COMPRESSIBLE DUSTY FLUID CONSIDERING FINITE VOLUME FRACTION AS WELL AS BROWNIAN DIFFUSION USING DIFFERENT TRANSFORM TECHNIQUE

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Abstract

The numerical solution of compressible dusty fluid considering finite volume fraction as well as Brownian diffusion 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 equations. The linearized boundary layer equations have been solved by using Hankle, Laplace and Crank Nicolson's transform technique. Numerical computations have been made to discuss the profiles of velocity and temperature of the fluid and particle. It is observed that consideration of Brownian diffusion helps in migration of particle through a longer distance and decrease the magnitude of velocity of the particle considerably which helps in settling of suspended particulate matter.

Keywords: Particulate suspension, Boundary layer characteristics, volume fraction, diffusion. Compressible fluid.

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