A MATHEMATICAL MODEL FOR TURBULENT BUBBLE PLUME

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A mathematical model for the underwater turbulent bubble plume has been constructed, assuming that slip velocity occurs between the gaseous and liquid phases. Such two-phase turbulent plume may be studied with the help of continuity equation and any one of governing equations e.g., momentum equation and the equation of energy. The present model has been constructed using the continuity equation and the equation of energy. In contrast to existing assumptions e.g., constant entrainment coefficient and constant spreading rate of the width it is assumed in the present model that the width of the plume spreads exponentially with the distance from the exit level of the plume. The distribution of the centerline velocity, relative entrainment coefficient and the relative Froude number are computed in a straight forward manner and discussed thoroughly.

Key words: **bubble plume, centerline velocity, entrainment coefficient, Froude number.**

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