TWO-PHASE THERMAL RADIATION EFFECTS ON THE SOUND WAVE PROPAGATION IN GAS-PARTICLE TWO-PHASE MEDIUM

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ABSTRACT. In this study, the two-phase radiation effects on the sound wave propagation through a planar gas-particle two-phase medium have been investigated. Extended from the earlier work, the radiative absorption and scattering by particles as well as gas are considered and the relaxation model is used only to describe the temporal momentum interaction between gas and particles. The P_1-approximation for two-phase radiation was newly formulated. The present study showed that the particle radiation alone without gas radiation did not incur the radiation induced wave attenuation. However, once the gas radiation was involved, the wave attenuation due to radiation was apparently influenced by the particle as well as gas radiation. As the gas absorption coefficient increased, the additional wave attenuation appeared only when the gas absorption coefficient became larger than the given particle absorption coefficient. In addition, the wave attenuation in low frequency region disappeared as the scattering coefficient increased. It was also observed that the forward scattering augmented the wave attenuation in low frequency region for a fixed scattering coefficient while the backward one reduced it.