

COMPARISON OF TWO STATISTICAL NARROW BAND MODELS FOR NON-GRAY GAS RADIATION IN PLANAR PLATES

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ABSTRACT. Non-gray gas radiation analysis and comparison are conducted by combining a ray tracing method and two statistical narrow band (SNB) spectral models, namely the Goody SNB model and the Malkmus SNB model. In this paper, gas radiation in real gas containing H₂O, H₂O/N₂, or H₂O/CO₂/N₂ mixtures at 1 atm in planar plates was studied. Comparisons between these models are performed using the latest narrow-band database. The present computations are validated by reproducing the published results in the literature. The radiative source term, the wall fluxes, the narrow-band radiation intensities along a line-of-sight and the computing time are all compared. From the comparisons, it is found that the Malkmus SNB model is somewhat superior to the Goody SNB model and the former is preferred in engineering application.