

A LOCAL-SPECTRUM CORRELATED MODEL FOR RADIATIVE TRANSFER IN NON-UNIFORM GAS MEDIA

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ABSTRACT. A new local-spectrum correlated model is developed for the solution of the Radiative Transfer Equation in non-uniform gas mixtures at high temperature. The spectral integration of the Radiative Transfer Equation is performed with the help of a new gas absorption spectrum distribution function termed the cumulative wavenumber. The new approach features local-spectrum correlation, rather than the global-spectrum correlation used traditionally. A local correction factor introduced to account for spatial variations in species concentrations and gas temperature is performed independently in each spectral interval under the assumption of local-spectrum correlation. Hence, the dependence of predictions on the selection of a reference temperature is nearly eliminated. The method is shown to be capable of treating non-gray particulates and boundaries.