MACRO-RANDOM MODEL OF A VIBRATIONAL BAND STRUCTURE

S. SURZHIKOV, *Institute for Problems in Mechanics Russian Academy of Sciences, Moscow, 117526, Russia*.

The problem of calculation of selective radiative heat transfer in gas volumes, containing such optically active components as CO_2, H_2O, CH_4, CO demands development of effective economic methods, allowing to refuse from uneconomical multigroup spectral models.

In the study the macro-random model, intended for calculation of radiating characteristics averaged in spectral regions, containing vibrational bands of absorption, is presented. The general idea of the model is that each vibrational band is considered as an isolated line of absorption. The shape of this line is described with the use of approximations suggested by Edwards. The average transition in a spectral region is obtained by multiplication of separate band transitions. The macro-random model is very economic, as allows to find averaged radiating characteristics without use "line by line" integration or any group models. The calculations made as though only for one spectral region. For calculation of radiative heat transfer in non-uniform volumes in the given study the Curtis-Godson method is used.

Comparative calculations of radiative heat transfer in non-uniform flat layers, containing molecules CO_2 and H_2O, were carried out with using of macro-random model and "line-by-line" integration. For determination of radiating characteristics the half-moment method was used.

This work is supported by Air Force Office of Scientific Research through Grant SPC-95-4041. The author would like to thank Dr. L.Rothman for his guidance and advice.