THE JOINT USE OF PATCH'S MEAN ABSORPTION COEFFICIENT AND THE DISCRETE TRANSFER METHOD IN GAS-ONLY ENVIRONMENTS

Miguel Caldas and Viriato Semião
Mechanical Engineering Department - Instituto Superior Técnico
Technical University of Lisbon, 1049-001 Lisbon, Portugal

ABSTRACT. Patch's mean absorption coefficient provides a very convenient way of calculating total radiative fluxes from one single solution of the Radiative Transfer Equation (RTE). It is particularly suited for use with the Discrete Transfer Method (DTM), since the path length required by this coefficient is explicitly calculated in the ray-tracing algorithm of the DTM. In this paper the join use of these two models is investigated. Concretely, the sensitivity of the results to the use of a mean path length and the conditions that allow for the achievement of accurate results are studied. It was concluded that Patch's mean coefficient can be effectively used jointly with the DTM if the external irradiation of the control volumes is not important when compared with the radiation generated with them. It was further concluded that the use of a suitable mean path length is more economical and provides acceptable results.