

HEAT TRANSFER ANALYSIS ON ONE DIMENSIONAL SEMI-TRANSPARENT MATERIALS

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A computation technique has been developed in order to treat transient heat transfer problems on one dimensional semi transparent materials.

This method allows computations of thermal response of material like glass. these are sensitive to the spectrum of the radiative source and to their intrinsic transmittance curve as well as their own reflectance curve.

The technique consists to separate the loading in an incident heat flux profile applied at one end of the solid surface in an internal volumetric heat energy profile. Both profiles are evaluated on a small spectrum range because they are greatly dependent on the wave length. The method is implemented in a finite element program with a user subroutine.

Some numerical simulations have been performed with a BK7 glass irradiated by two black bodies at respectively 2700 K and 6000 K. Significant differences are observed in the results. Computations using a measured TRS spectrum are also compared to the previous one.