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Conduction Accompanied With Transient Radiative Heat Transfer Using Finite Volume Method

Authors : A. Ashok, K.Satapathy, B. Prerana Nashine

Abstract : The objective of this research work is to investigate for one dimensional transient radiative transfer equations with conduction using finite volume method. Within the infrastructure of finite-volume, we obtain the conservative discretization of the terms in order to preserve the overall conservative property of finitevolume schemes. Coupling of conductive and radiative equation resulting in fluxes is governed by the magnitude of emissivity, extinction coefficient, and temperature of the medium as well as geometry of the problem. The problem under consideration has been solved, for a slab dominating radiation coupled with transient conduction based on finite volume method. The boundary conditions are also chosen so as to give a good model of the discretized form of radiation transfer equation. The important feature of the present method is flexibility in specifying the control angles in the FVM, while keeping the simplicity in the solution procedure. Effects of various model parameters are examined on the distributions of temperature, radiative and conductive heat fluxes and incident radiation energy etc. The finite volume method is considered to effectively evaluate the propagation of radiation intensity through a participating medium.

Keywords : participating media, finite volume method, radiation coupled with conduction, transient radiative heat transfer
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