

عنوان مقاله:

Numerical Study of Coupled Non-Gray Radiation and Separation Convection Flow in a Duct using FSK Method

محل انتشار:

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خلاصه مقاله:

In this research, the coupling between non-gray radiation and separation convection flow in a duct is investigated numerically. Distributions of absorption coefficients across the spectrum are obtained from the HITRAN^{۲۰۰۸} database. The full-spectrum k-distribution method is used to deal with the non-gray part of the problem, while the gray radiation calculations are performed using the Planck mean absorption coefficient. To find the divergence of radiative heat flux distribution, the radiative transfer equation (RTE) is solved by the discrete ordinates method (DOM). The effects of radiation-conduction parameter, scattering coefficient and wall emissivity on thermal behaviors are investigated for both gray and non-gray mediums. In addition, the results of gray medium are compared with non-gray results as a real case. The results show that in many cases, use of gray simulations is not acceptable and leads to significant errors, especially in non-scattering medium with high values of radiation-conduction parameter and wall emissivity.

کلمات کلیدی:

Backward facing step, Combined convection-radiation, DOM, FSK method, Non-gray medium, Separation flow

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