

IMPROVEMENT OF THE FINITE VOLUME METHOD FOR COUPLED FLOW AND RADIATION CALCULATIONS BY THE USE OF TWO GRIDS AND ROTATIONAL PERIODIC INTERFACE

Thomas Badinand, Torsten Fransson

*Heat and Power Technology Department

The Royal Institute of Technology, 10044 Stockholm, Sweden

ABSTRACT. A method is presented to improve the Finite Volume Method for coupled flow calculation with radiation by the definition of a mesh for the radiation calculation different from the one used for the flow calculation. A simplified implementation of a rotational periodic interface is also explained. After validation of the method, it is applied to compute the flow inside a premixed combustor with rotational symmetry for gray gases. An impressively low dependency of the result on the spatial mesh used for radiation calculations was observed. This shows that the use of two meshes is a very accurate and easy way to reduce the memory required for radiative heat transfer calculations and to increase the computational speed with the Finite Volume method.