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Numerical study of thermally stratified flows of a fluid overlying a highly porous material[1] PANAGIOTIS D. ANTONIADIS, MILTIADIS V. PAPALEXANDRIS, Université catholique de Louvain — In this talk we are concerned with thermally stratified flows in domains that contain a macroscopic interface between a highly porous material and a pure-fluid domain. Our study is based on the single-domain approach according to which the same set of governing equations is employed both inside the porous medium and in the pure-fluid domain. Also, the mathematical model that we employ treats the porous skeleton as a rigid solid that is in thermal non-equilibrium with the fluid. First, we present briefly the basic steps of the derivation of the mathematical model. Then, we present and discuss numerical results for both thermally stratified shear flows and natural convection. Our discussion focuses on the role of thermal stratification on the flows of interest and on the effect of thermal non-equilibrium between the solid matrix and the fluid inside the porous medium.

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