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Numerical study of thermally stratified shear flows at the interface between porous and pure-fluid layers[1] MILTIADIS V. PAPALEXANDRIS, PANAGIOTIS D. ANTONIADIS, Université catholique de Louvain — In this talk we are concerned with thermally stratified flows at the interface between superposed porous and pure-fluid layers. In our study we employ a thermo-mechanical model for the flows of interest that was recently developed by our team. According to this model, both the fluid and the solid matrix are treated as two separate and identifiable continua that are in thermal non-equilibrium with each other. This allows for the derivation of a single set of equations that are simultaneously valid both in the porous and pure-fluid regions. First, we briefly present the basic steps of the derivation of the mathematical model and describe an algorithm for its numerical treatment. Then, we present and discuss numerical results for transient shear flows in the domains of interest, under both stable and unstable thermal stratification. Emphasis is placed on the effects of buoyancy to the evolution of the flow structures at the interface and on the mechanisms that induce thermal non-equilibrium inside the porous medium.

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