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N.Massarotti and P.Nithiarasu (Eds.)

NUMERICAL TECHNIQUES FOR HEAT AND FLUID FLOW THROUGH POROUS MEDIA

Fausto Arpino
University of Cassino
DiMSAT – Dipartimento di Meccanica, Strutture, Ambiente e Territorio
via G. Di Biasio 43, 0343 Cassino, ITALY
f.arpino@unicas.it

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PROPOSAL

The study of heat and fluid flow in porous domains or fluid domains that are partially filled with a porous medium is an important area of research for many engineering applications such as packed beds, thermal insulation, alloy solidification, geothermal problems, energy conversion systems, blood flow through biological tissues, electronic cooling, etc.

Flow and energy transport in porous media represents a two-phase phenomenon where one of the phases is solid and stationary. The wide range of length scales and the complexity of the geometries involved makes a pore level analysis very expensive from the computational point of view. Thus, modelling efforts in this area, dating back to Darcy's experimental study in 1856, have mostly aimed at empirically correlating the pore level flow effects to the bulk fluid motion.

More recently, with the increasing computational power, flow modelling in porous media received a significant boost and more general models have been introduced, allowing the resolution of complex interface problems between saturated porous media and free fluids, encountered in many practical applications. A general modelling approach is also useful for the simulation of near wall flow for bounded media, where the effect of variable porosity and of double diffusive convection have to be taken into account.

The aim of this mini-symposium is to gather researchers interested in fundamentals as well as applied research for the simulation of systems involving heat and fluid flow in porous media.

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