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Natural convection from a horizontal annulus partially filled with porous medium

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Abstract: A steady laminar flow conjugate free convection from a horizontal annulus is investigated. Two cases concerning the location of the porous layer were considered. In the first case the porous layer is located adjacent to the inner cylinder. In the second case the porous layer is located adjacent to the outer cylinder. Solution is obtained using a finite volume method. The effect of the physical parameters, Grashof number, Darcy number, and porous layer thickness, on the local and average Nusselt number were calculated and presented. Comparison with completely filled with porous media annulus, and with clear fluid case is also presented.