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Free Convective Flow in a Vertical Cylinder with Heat Sink: A Numerical Study

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Abstract : A mathematical model is presented to study free convective boundary layer flow in a semi-infinite vertical cylinder with heat sink effect in a porous medium. The governing dimensional governing partial differential equations (PDEs) with corresponding initial and boundary conditions are approximated and solved numerically employing finite difference method (FDM) the implicit type. Stability and convergence of the scheme are also established. Furthermore, the influence of significant physical parameters on the flow characteristics was analysed and shown graphically. The obtained results are benchmarked with previously published works in order to access the accuracy of the numerical method and found to be in good agreement.

Keywords : free convection flow, vertical cylinder, implicit finite difference method, heat sink and porous medium
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