Abstract

Theoretical and experimental investigations of forced convection heat transfer from a heated flat plate embedded in porous media with a constant heat flux had been carried out in the present work. The experimental investigation included a set of experiments carried out to study the effect of Reynolds number and heat flux on the temperature profile and local Nusselt number. The investigation covered values of heat flux of (1000, 2000, 3000, 4000 and 5000 W/m²) and Reynolds number values of (24118, 44545, 739832 and 82208). Fluent program has been used to simulate all cases of the experimental work. The numerical investigation covers all values of heat flux and velocities in the experimental work. The initial values and boundary conditions are similar for both theoretical and experimental investigation. It is observed that the local wall temperature gradually increases with the flow direction, decreases with the Reynolds number and increases with heat flux, but the fluid temperature progressively decreases in the porous medium with the vertical direction away from the heated wall, and the results show an increase in local Nusselt number when Reynolds number and heat flux increase.

References
An Investigation into Forced Convection Heat Transfer through Porous Media


Index Terms

Computer Science  Applied Sciences
Keywords
Forced convection  Porous Media  Experimental and Numerical Study