

Abstract Submitted
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Direct numerical simulation of turbulent mixed convection in heated vertical annulus¹ YONG JOON JUN, School of Mechanical and Aerospace Engineering, Seoul National University, Seoul 151-744, South Korea, JOONG HUN BAE, Department of Mechanical and Aerospace Engineering, University of California, Los Angeles, 420 Westwood Plaza, Los Angeles, CA 90095-1597, U.S.A., JUNG YUL YOO, School of Mechanical and Aerospace Engineering, and Institute of Advanced Machinery and Design, Seoul National University, Seoul 151-744, South Korea — Turbulent mixed convection in heated vertical annulus is investigated using Direct Numerical Simulation (DNS) technique. The objective of this study is to find out the effect of buoyancy on turbulent mixed convection in heated vertical annulus. Downward and upward flows have been simulated to investigate turbulent mixed convection by gradually increasing the inner wall heat flux. With increased heat flux, heat transfer coefficient first decreases and then increases in the upward flow due to the effect of buoyancy, but it gradually increases in downward flow. The skin friction increasingly rises in upward flow, while it slightly decreases in downward flow. All simulation results are in good agreement with existing numerical and experimental results.

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