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Numerical study on the heat transfer in a horizontal annulus with rib-mounted on outer cylinder GYUDEOK HWANG, SEONG-GU BAEK¹, SAMSUNG Electronics Co., LTD. — This study deals with the three-dimensional numerical simulation for laminar mixed convection of air in a horizontal concentric annulus between a heated, rotating inner cylinder and a riblet-mounted outer cylinder. The riblet with a triangluar cross-section is attached on the inner surface of the outer cylinder in azimuthal direction, which is the main streamwise direction. The height and the width of the riblet is about 0.1% of the distance(H) between the two cylinders and the distance is set to be the same of the radius of the inner cylinder. The heat transfer in a horizontal annulus has been studied experimentally and numerically by many researchers in recent decades. So far as authors know, the research on the effect of the small structures on the annular cylinder is very few. The riblet structure near the wall is widely utilized to many applications because it plays role to reduce the drag in a turbulent boundary layer. It increases the drag in a laminar boundary layer. It is interesting point to note that the heat transfer is enhanced for turbulent flows and deteriorated for laminar flows, which was the results of the Direct Numerical Simulation. We will examine the effect of the riblets on the heat transfer in annular cylinders. Numerical results are obtained for the Reynolds number Re_H , ranging from 10 to 10^3 , the Rayleigh number Ra, ranging up to 10^6 .

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