Finite Amplitude Analysis of Mixed Convection in a Vertical Annulus Filled with Porous Medium. PREMANANDA BERA[1], MOUMITA BHOWMIK, Indian Institute of Technology Roorkee — Using the weakly nonlinear stability analysis, we have investigated the stability of stably stratified mixed convective flow in a vertical annulus filled with fluid saturated metallic foam with porosity 0.97. Since the curvature parameter (C)plays a vital role to describe the geometry, therefore special attention has been given to understand the effect of Con the flow by considering three different values of C(0.001, 0.6, and 10). The nonlinear results are presented for the fluid as water (Prandtl number (Pr)equal to 7) and a fixed Reynolds number Reequal to 500. In the entire weekly nonlinear analysis, only super critical bifurcation has been predicted at and beyond the critical Rayleigh number (Ra).The equilibrium amplitude $(|A|)$ increases beyond the critical point and decreases on reducing the gap between the concentric cylinders. Due to nonlinear interaction, a substantial enhancement in heat transfer rate is also observed from the basic state beyond the bifurcation point, i.e. Nusselt number predicted by nonlinear analysis is much more than those predicted by fully developed basic state.

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