Abstract Submitted
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Transient buoyancy-driven flow in a vertical cylindrical enclosure with wavy-sidewall due to thermal and concentration gradients[1] FAUSTO SANCHEZ, SIMON MARTINEZ, HUGO RAMIREZ, Universidad Autonoma de Nuevo Leon, ABRAHAM MEDINA, Instituto Politecnico Nacional — An axisymmetric transient convection flow, due to thermal and concentration gradients within a vertical cylindrical enclosure with adiabatic wavy sidewall, was studied. The two important cases of enclosure heated from below and heated from the top were studied. An analytical coordinate transformation was used to change the computation domain into a square. The heat and mass transfer were analyzed using non-dimensional parameters which include the cavity aspect ratio, the dimensionless wavelength and amplitude of the wavy-wall, Rayleigh and Prandtl numbers and the buoyancy ratio. For all cases the upper surface is consider as the one with high concentration, while the others are impermeable. Numerical results using a streamfunction formulation were developed. Heatlines and mass lines were used to illustrate the transport phenomena. Average Nusselt and Sherwood numbers were evaluated while the convection patterns arise within the cavity. The wavy-wall was found to promote thermal stratification and low velocity multiple cell patterns for low buoyancy ratio.

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