

## **A numerical investigation of turbulent natural convection in a 3-D enclosure using k- $\omega$ SST model and Simple method**

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### **ABSTRACT**

The objective of this study is to conduct a numerical investigation of turbulent natural convection in a 3-Dcavity using the k- $\omega$  SST model and the SIMPLEC method. The statistical-averaging process ofthemas, momentum and energy governing equations introduces unknown turbulent correlations into the mean flow equations which represent the turbulent transport of momentum, heat and mass, namely Reynolds stress( $\overline{u_i u_j}$ ) and heat flux( $\overline{u_i \theta}$ ), which are modelled using k- $\omega$  SST model. The Reynolds-Averaged Navier-stokes (RANS), energy and k- $\omega$  SST turbulent equations are first non-dimensional zed and the resulting equations are discretized using Finite Volume Method and solved using SIMPLEC. From the results, both the experimental data and simulation using SIMPLEC return a non-dimensional temperature of 0.5 at the core of the cavity and almost zero towards the cold and the natural turbulence flow is responsible for temperature distribution.

**KEYWORDS:** Turbulence, natural Convention, k- $\omega$  SST, SIMPLEC Method

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