ID-1909 - EXPERIMENTAL RESULTS FOR NATURAL CONVECTION HEAT TRANSFER IN A CAVITY WITH FLUSH MOUNTED HEAT SOURCES

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Abstract. In this work, a experimental study of the natural convection heat transfer in a cavity with discrete heat sources flush mounted in one of the walls, simulating electronic components, is carried out. The inferior and superior walls are insulated and the temperature of the opposite wall to the one with heat sources is maintained constant, lower than the environment temperature. The influence of power dissipated by the sources, the cooling temperature, the aspect ratio and the inclination angle of the cavity with respect to the horizontal plane, on the flow and the heat transfer, have all been evaluated. Cubic cavities were built and experimental tests for measure of the temperature was realized by using thermocouples and a data acquisition system controlled by computer, being obtained the temperature fields inside the cavity, as well as the temperature distribution in the wall where the heat sources are mounted. The results were compared with respect to the maximum temperature in the cavity, that is the parameter of larger interest in the problem. Additionally, flow visualization was realized by using the smoke tracing technique generated by burning incense.

Keywords. Natural convection, thermal cavity, heat sources, temperature measurements.

ID-1949 - PARALLEL CFD APPLICATION: NATURAL CONVECTION IN A SQUARE CLOSE CAVITY

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Abstract. At the present work, natural convection of liquid metal inside a closed cavity is examined, based on the Boussinesq approximation. The upper and lower cavity walls are adiabatic, while the vertical walls are at uniform and different temperatures. The problem was numerically solved by the finite volume method, based on the power-lawinterpolating scheme. The pressure-velocity coupling was solved with the algorithm SIMPLEC. The solution was validated comparing by with some experimental and numerical results available in the literature. The software was implemented using Fortran77 with message passing on twenty PIII processors Linux cluster. The results show that the introduction of parallelism does not affect the code precision and provides a significant reduction in the processing time.

Keywords. Natural convection, parallel cfd.

ID-1989 - STRUCTURE AND PROPERTIES OF NANOCRYSTALLINE SOFT MAGNETIC COMPOSITE MATERIALS WITH POLYMER MATRIX

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Abstract. The paper concerns investigation of nanocrystalline composites technology preparation. The composites in the form of rings with rectangular transverse section, and with polymer matrix and nanocrystalline metallic powders fulfillment were made, for obtaining a good ferromagnetic properties. The nanocrystalline ferromagnetic powders were manufactured by high-energy ball milling of metallic glasses strips (as quenched and after annealing state). Generally for investigation, Co matrix alloys and thermoplastic and hardening polymers including elastomers were used. Magnetic properties in the form of hysteresis loop, by rings method were measured. Magnetic properties of composites materials were compared with properties of winded cores of nanocrystalline strips and powder cores (rings) solidify by pressing and gluing. Generally powder cores showed lower soft ferromagnetic properties than winded cores of nanocrystalline strips, but composites cores showed interesting mechanical properties. Furthermore, the structure of strips and powders on properties of composites were investigated.

Keywords. Nanocrystallisation, Powders, Metalic glasses, Magnetic properties, High-energy ball milling, Composites