

New Possibilities of Computer Laboratory COMGA for Modelling of Convective Processes

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COMGA system for modelling of convective flows for heat and mass transfer problems on the basis of Navier-Stokes equations in a Boussinesq approximation uses unique experience of modelling¹ and is actively being developed as a computer laboratory tool for PC²⁻⁴. A concept of computer laboratory includes possibilities of a statement and a solution of classical problems of natural, forced and capillary convection in both dimensional and non-dimensional forms, approved for international tests effective numerical algorithms, wide library of solved problems, full access to a solution, friendly software interface, visualisation being created an impression of natural experiment. COMGA includes possibilities of 2D flat and axisymmetrical unsteady problems of convection in enclosures, including Rayleigh-Benard, Rayleigh-Taylor and Marangoni instabilities development.

Recently, system possibilities are extended for mathematical models for crystal growth processes: Czochralski, directional solidification (horizontal Bridgman technique), floating zone. These processes are introduced as separate problem classes for effective use of the system. The model of directional solidification includes calculation of impurity concentration that defines a quality of growing crystal both in a melt and in a crystal.

Report includes demonstration of system possibilities and animation of modelling physical processes.

References

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