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A New Simulation Framework for the Natural Convection in Practical Products CHUNGGANG LI, RIKEN Advanced Institute for Computational Science, TSUBOKURA MAKOTO, Department of Computational Science, Graduate School of System Informatics, Kobe University — Natural convection is one of the most major heat transfer methods in practical products owing to its cost effectiveness. This kind of topic accompanies with several critical issues including the high temperature difference, rapid turnaround and complex geometry. The present program adopts all-speed preconditioned Roe (A-P-Roe) to solve low speed compressible flows caused by natural convection. Besides, Building Cube Method (BCM) with a new interpolation method for the immersed boundary is utilized to increase the turnaround speed and handle complex geometry. The results show that the present program can be adopted in massively parallel systems such as ExaFlops computers because of good strong scaling test and is suitable for designing and analyzing products due to its high performance and wide availability.

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