GCOE プログラム「機械システム・イノベーション国際拠点」
公開セミナー

GCOE プログラム「機械システム・イノベーション国際拠点」平成 20 年度公開セミナーを開催いたします．インド工科大学 Guwahati 校の Subhash C. Mishra 先生は放射伝熱や多孔質体内の燃焼などの研究を精力的に進めて世界的に著名です．現在，東北大学を訪問中の機会に機械系 GCEO でのセミナーをいただけることとなりました．ふるってご参加いただきますようどうぞ宜しくお願い申し上げます．

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題目：Lattice Boltzmann Method Applied to the Solution of Energy Equations of Heat Transfer Problems Involving Thermal Radiation

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概要：In the recent past, the lattice Boltzmann method (LBM) has received much attention in science and engineering as a potential computational tool for solving a large class of problems. Among many other types of problems, the LBM has been successfully used to simulate a wide range of fluid flow and heat transfer problems. Owing to its mesoscopic origin, the LBM is emerging as a versatile computational method that has many advantages. In comparison to the conventional CFD solvers like the finite difference method, the finite element method and the finite volume method, the advantages of the LBM comprises of a clear physical meaning, a simple calculation procedure, simple and more efficient implementation for parallel computation, straightforward and efficient handling of complex geometries and boundary conditions, high computational performance with regard to stability and precision, etc.

This lecture will focus on implementation of the LBM to solve energy equations of heat transfer problems involving thermal radiation in which radiative information can be computed using any of the numerical radiative transfer methods like the discrete transfer method, the discrete ordinate method and the finite volume method. Some example problems dealing with conduction, convection and radiation heat transfer will be taken up to show the workability of the LBM. Cases of implementation of the LBM to solidification and natural convection problems will be taken up. Implementation of the LBM on non-uniform lattices and for non-Fourier conduction cases will also be discussed.

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