Title : Computational modelling of reacting flows and applications

Abstract

: Reactive flows are governed by a system of equations with convection, diffusion, and source terms. The equations are in most case highly nonlinear that novel numerical methods are required for the computational modelling and simulation of the reactive systems. In this seminar, recent development of Godunov methods and Riemann solvers to describe compressible multi-phase and multi-fluid flows and its application is introduced. A novel method to overcome a so-called interface problem is highlighted.

Then, as a summary of recent efforts, the application of direct numerical simulation (DNS) and large eddy simulation (LES) to unravel fundamental physics of combustion and flames at different scales is demonstrated. In later part of the seminar, recent trend of computational modelling of reacting flows associated with the advent of high performance computing (HPC) is presented.