Department of Mechanical Engineering
機械工程學系

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

Seminar

Date: 12 October 2009 (Monday)
Time: 2:30 pm - 4:30 pm
Venue: **CF302**, The Hong Kong Polytechnic University

Advanced DES methods and their application to aeroacoustics

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Abstract:

Detached eddy simulation (DES) is the most suitable method for the simulation of the sound radiation of turbulent flows, because it provides access to the resolved turbulent scales at minimal computational cost. The near-wall region is solved efficiently by RANS while LES is applied to all regions containing scales important for the noise generation. The smallest of these scales are defined by the highest frequencies of interest. The sound radiation is computed by solving an integral over a data surface surrounding the source region outside the turbulent flow. The grid must be fine enough between the sources and the data surface to limit the amplitude and phase errors of the sound waves during their propagation. The lateral size of the computational domain must be in the order of one wavelength of the lowest frequency of interest. Examples for the simulation of noise emission problems are presented for jet mixing noise and three airframe noise sources, rod-airfoil interaction noise, the noise of high-lift devices, and airfoil self noise.

Biosketch:

Prof. Frank Thiele is the Chair Professor of Computational Fluid Dynamics (CFD) and Computational Aeroacoustics (CAA) at Institute of Fluid Mechanics and Engineering Acoustics, Technical University of Berlin (ISTA–TUB). Prof. Thiele has been the Director of Hermann-Föttinger Institute of Fluid Mechanics at TUB since 2002 and is now the Head of CFD and CAA Group. His research specialism is fluid mechanics, turbulence modeling, computational fluid dynamics, stability analysis and computational aeroacoustics, and played an active role in many German-wide and international research projects in such areas as passive and active flow control, global stability analysis, reacting flows, turbulence modeling, DNS/LES, and aeroacoustics.

* Refreshment will be served after the seminar.