機械工学セミナー
Mechanical Engineering Seminar

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主催: 慶應義塾大学理工学部機械工学科
Department of Mechanical Engineering, Keio University

日 時(Date):
2017年11月29日(水) (Nov. 29, 2017 (Wed.)) 10:00～11:00

場 所(Venue):
M科会議室 (ME Meeting Room) (24-214)

講演題目(Title)
Advanced Numerical Methods for Aircraft Related Aerodynamics

講演者(Speaker)
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Abstract:
In this presentation various numerical ingredients for turbulence scale resolving simulations including their application to problems related to aerodynamics will be presented. The method basis is a finite-volume method formulated for hierarchical Cartesian meshes and arbitrary moving objects. A fully conservative cut-cell method is used to sharply resolve immersed boundaries, where a smoothed difference stencil avoids unphysical pressure oscillation when fluid cells vanish or appear in the fluid domain. The surface location is efficiently tracked by a level-set method. Furthermore, a hybrid RANS-LES method is introduced, which allows to accurately couple predefined RANS with LES regions. These methods are applied to predict turbulent flow field around axial fans, turbine stages and base flows of rocket launchers. An advanced analysis of the unsteady three-dimensional flow field is used, including dynamic mode decomposition, to identify and analyze flow features responsible for oscillating loads or the generation of aero-acoustic noise.

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