

## Special Program in Applied Mathematics and Applied Mechanics

*CFD Application on Ship Hydrodynamics*

2015 - 01 - 07 (Wed.)

15:00 - 18:00

308, Mathematics Research Center Building (ori. New Math. Bldg.)

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Numerical basics of Computational Fluid Dynamics (CFD) are firstly reviewed, especially focused on incompressible Navier-Stokes equations for ship hydrodynamic applications. Hydrodynamic aspects play a critical role in ship design and performance assessment. Reliably and accurately evaluating hydrodynamic performance in the ship design process is a required and challenging task for ship designers. Traditionally scaled-model test is the only approach to evaluate ship hydrodynamic performances. Since CFD numerical techniques were developed, it has provided a new approach for this important design task. Furthermore with recent great advance in the development of ship CFD technology, practical applications of CFD in analyzing and predicting ship performance now become possible.

Ship hydrodynamic performances generally include three major areas, which are powering, sea-keeping, and maneuvering performance. Detailed discussions on each hydrodynamic phenomenon will be described, along with CFD numerical approaches to solve this hydrodynamic phenomenon. The current status of applying advanced CFD techniques for each problem will also be discussed. Multi-disciplinary CFD applications with multiple physical coupling such as fluid-structure interaction (FSI), hydro-acoustics, and aerodynamics will be included. CFD applications on various types of ships, either commercial or military ships are also discussed



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