S15 – Advanced and Multiphysics CFD

Organizers: Akira Fujii & Koichi Nishibe

In the last decades, the development of turbomachinery has progressed noticeably to elucidate internal flows by conducting Computational Fluid Dynamics (CFD) computations in addition to experiments. To further improve the efficiency of turbomachinery and develop the next generation of hydraulic machines, it is essential to clarify details of complex phenomena such as unsteady flow, vibration phenomena, fluid noises, thermal stresses, chemical kinetics, fluid interaction, and electromagnetic field. Recently, Advanced and Multiphysics CFD have been touted as a solution method to clear up these phenomena, and its contribution to technology improvement is significant. Thus, presenters and audiences are invited to participate in this session to share innovative ideas and expand international cooperation and understanding in the field of **Advanced and Multiphysics CFD**.

Non-exhaustive list of suggested topics

- CFD solvers and methods
- CFD Development
- Applied CFD
- Advanced techniques on CFD
- Multiphysics CFD
- Coupled methods for multiphysics
- Structural-acoustic coupling
- Magnetic-thermal-structure-fluid coupling
- Pressure pulsation, vortex shedding, phase resonance
- Flow induced vibration
- Sound and vibration, noise control
- Modal analysis (mode shapes, natural frequencies, damping, added mass of fluid)
- Fatigue and damage analysis
- CFD verification and validation
- Accuracy and robustness in discretization
- Mesh generation and adaptivity
- Optimization, data-based simulations
- Machine Learning & Deep Learning
- Digital Twin

Organizers

Akira Fujii is working as a Lead Application Engineer at ANSYS Japan. His specialty is CFD (Computational Fluid Dynamics) for the turbomachinery including cavitating flow and FSI (Fluid Structure Interaction). He is also working on the IoT/Digital Twin regions for the predictive maintenance.

Koichi Nishibe is working as an Associate Professor at Department of Mechanical Engineering of Tokyo City University (Tokyo, Japan). His research interests include topics related to multi-phase and particulate flows, performance improvement and active control of unsteady internal flow of positive displacement machines and turbomachinery such as pump, fan, compressor, based on understanding obtained by comparison between Computational Fluid Dynamics (CFD) and Experimental Fluid Dynamics (EFD).

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