

Invitation

November 5

Lagrangian Vortex Method

Lagrangian Vortex Method for Complex Flow Simulation Applied in Aerospace, Wind, and Biology

To solve complicated simulation problems for complex deforming objects under complicated motions found in aerospace, aerodynamics, meteorology, biology engineering, this seminar presents *Lagrangian vortex* method based on *Brinkman* penalization. The *Brinkman* penalization acts as an external force, which directly replaced in the Navier-Stokes equation, is described by velocity and vorticity. The advantage of the method is the capability to remove the pressure factor which causes errors in other numerical methods due to the complexity of the shape of the object. Besides, the method can model the complex geometry, complex motions as well as 3D deformation of the object. Then, the equation can be solved in a classical strategy: applying the Bio-Savart law formula is to deal with the convection process; the diffusion process can be solved by two methods: core spreading vortex method and particle strength exchange. The convergence is verified in several simulation applications such as airflow in rotation wings of a helicopter, side wings of UAV, the influence of stormwind on a high-raised building, and fish swimming.

Time: 3:30pm-4:30pm, Tuesday, November 5, 2019

Venue: G2-315, 144 Xuan Thuy, Cau Giay, Hanoi

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Dr. Duong Viet Dung is currently a researcher in School of Aerospace Engineering, University of Engineering and Technology, VNU, Hanoi. He finished his bachelor degree in Aerospace Engineering in Hanoi University of Science and Technology (2003-2008); Master and the Ph.D. degree in Aeronautics and Astronautics in Institut Technology Bandung, Indonesia (2008-2015). He got his Postdoctoral Fellow of Wind Engineering in Tokyo Institute of Technology, Japan (2016-2019). He mainly focuses on the simulation of airflow in aerospace, aerodynamics, meteorology, biology engineering.

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