**Topic**: A Numerical Method for the Fluid-Structure Interaction Problems Based On the Gas Kinetic Theory

时间：9:00-10:15

地点：例会地点

邀请人：吴海军

Speaker: Ren Xiaodong (任晓东)

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**Abstract**:

Problems with variable domains are commonly present in many engineering applications, such as aeroelastic problems, thermoelastic, and insect flight problems. Due to the complication of these problems, measurements are sometimes limited for capturing partial information of these complex flow phenomena. Fortunately, the numerical simulation gives us another choice to understand the flow problems. In this talk, a multi-dimensional high-order method in an arbitrary Lagrangian-Eulerian (ALE) formulation is proposed to simulate flows over variable domains with moving and deforming meshes. A gas kinetic evolution model with a mesh velocity distribution is proposed for both inviscid and viscous flux evaluations and the flux integration over a moving surface in space and time. A structure code based on the traditional finite element method is used to simulate the structure dynamic responses under the loading from the fluid flow field. A full-matching mesh scheme is used on the fluid-structure interface to avoid the data interpolation. All the calculation is conducted in the physical domain rather than in a referential domain, and the numerical scheme can preserve the uniform flow automatically, which means the geometric conservation law (GCL) is satisfied.

Speaker:

Dr. Ren Xiaodong graduated from Tsinghua University in 2013. He is a post-doctoral fellow of the Department of Mathematics in Hong Kong University of Science and Technology. He focuses on the numerical method based on the gas kinetic theory for the compressible flows and its applications.