数学与系统科学研究院

计算数学所网络学术报告

报告人： 王奇 教授

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报告题目：

A Phase Field Embedding Method for Flow-Active Particle Interactions

邀请人： 许现民 副研究员

报告时间：2021 年 3 月 26 日（周五）

上午 9:00-10:00

报告工具：腾讯会议（ID：950 380 707）

会议链接：

https://meeting.tencent.com/s/qmSA4p2KbZfo

Abstract：

We present a novel computational framework to numerically investigate fluid structure interaction using the phase field embedding. Each solid structure or soft matter structure immersed in the fluid, grossly referred to as the particle in this paper, is represented by a volume preserving phase field. The motion of the active particle is driven by the surrounding fluid velocity and its self-propelling velocity. A repulsive force exists between each pair of particles and between a particle and the boundary. The particle also exerts a drag force to the fluid. When the particle is solid, its state is described by a zero velocity gradient tensor and a phase field that defines its profile. A thermodynamically consistent hydrodynamic model is then derived for the fluid-particle ensemble by the generalized Onsager principle. Structure-preserving numerical algorithms are developed for the thermodynamically consistent model. Numerical tests are carried out to verify the rate of convergence and some numerical examples are given to demonstrate the usefulness of the computational framework for simulating fluid-structure interactions for self-propelling active particles.

欢迎大家参加！