



復旦大學
FUDAN UNIVERSITY

Applied Math
Ph.D. Seminar

New unconditionally stable higher-order consistent splitting schemes for the Navier-Stokes equations

Speaker: Fukeng Huang (National University of Singapore)

Time: 2023-09-28, 16:10 to 17:00

Location: Rm 1801, Guanghua East Tower

Advisor: Weizhu Bao (National University of Singapore)

Abstract: The consistent splitting schemes for the Navier-Stokes equations decouple the computation of pressure and velocity, and do not suffer from the splitting error. However, only the first-order version of the consistent splitting schemes is proven to be unconditionally stable for the time dependent Stokes equations. We construct a new class of consistent splitting schemes of orders two to four for Navier-Stokes equations based on Taylor expansions at time t_{n+k} where $k \geq 1$ is a tunable parameter. By choosing suitable k , we construct, for the very first time, unconditionally stable and totally decoupled schemes of orders two to four for the velocity and pressure, and provide rigorous optimal error estimates. We shall also present some numerical results to show the computational advantages of these schemes. This is a joint work with Jie Shen.