数学与系统科学研究院

计算数学所学术报告

报告人：　赵文举博士

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报告题目：

Stochastic Dirichlet Boundary Optimal Control of Steady Navier-Stokes Equations

邀请人：　　周涛副研究员

报告时间：2018 年 2 月 2 日（周五）

上午 10:00--11:00

报告地点：数学院科技综合楼

Z311 报告厅

报告摘要：

When a physical system under control includes a stochastic component, the construction, modeling, and analysis of the controls become much more difficult. As a specific case, we consider the optimal control of a system governed by the

Navier-Stokes equations with a stochastic Dirichlet boundary condition. Control conditions applied only on the boundary are associated with reduced regularity, as compared to internal controls. To ensure existence of solution and efficiency of numerical simulations, the stochastic boundary conditions are required to belong almost surely to $H^1(\partial\cald)$, similar to the H-valued infinite dimensional Wiener process. To simulate the system, state solutions will be approximated using the stochastic collocation finite element approach, and sparse grid techniques are applied to the boundary random field. The one shot optimality systems are derived from the Lagrange functional. Error estimates are computed for the optimality almost surely using samples, and for the state equation using interpolated boundary conditions. Error estimates for the adjoint equations are derived from a duality argument, and the control equation comes via a non-conforming finite element variational crime. A numerical simulation can then be made, using a combination of Monte Carlo and sparse grid methods, which demonstrates the efficiency of the algorithm.

欢迎大家参加！