



# Numerical Analysis Seminar

## Finite Element Methods for Backward Stochastic Partial Differential Equations and Its Error Estimates

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### **Abstract**

Since the existence and uniqueness of the solution for nonlinear backward stochastic differential equations (BSDEs) were first established by Pardoux and Peng in 1990, the theories and numerical methods of BSDEs have been widely studied and great successes have been achieved in the stochastic optimization and finance, etc. By incorporating the physical status into BSDEs, we turn to the backward stochastic partial differential equations (BSPDEs) which are also of great study significance, especially, in the fields of stochastic partial differential equations constrained stochastic optimal control and their related fields. In this talk, we present numerical methods for solving a class of nonlinear backward stochastic partial differential equations by combining the finite element methods in space and  $\theta$ -scheme in time. We rigorously give error estimates of the proposed scheme. Since the computational complexity of BSPDEs is greatly larger than the forward SPDEs, our algorithms are all designed in parallel. Numerical simulations are then parallelly done on HPC to confirm the effectiveness and validate the theoretical analyses.

Date: Feb. 7, 2024 (Wednesday)

Time: 2:00 pm - 3:00 pm

Venue: ZOOM: <https://hku.zoom.us/j/>

Meeting ID: 913 6532 3891

Password: 310656