

数学与系统科学研究院

计算数学所学术报告

报告人: **Prof. Jiequn Han**

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报告题目:

**High-Dimensional Partial
Differential Equations, Optimal
Control, and Deep Learning**

邀请人: 明平兵 研究员

报告时间: 2018 年 8 月 13 日 (周一)

上午 10:00-11:00

报告地点: 数学院南楼七层

702 教室

Abstract:

In the first part of talk, we will introduce a new approach based on deep learning, deep BSDE method, to solve general high-dimensional parabolic PDEs. To this end, the PDEs are reformulated using backward stochastic differential equations from a control perspective and the gradient of the unknown solution is approximated by neural networks. Numerical results of a variety of examples demonstrate that the proposed algorithm is quite effective in high-dimensions, in terms of both accuracy and speed. In the second part of talk, we will discuss the dynamical systems viewpoint of deep learning. In particular, learning is formulated as an optimal control problem, which takes into explicit account the compositional structure of deep neural networks. Based on this viewpoint, we will present a novel training algorithm as well as a concrete mathematical framework to study deep learning in terms of "mean-field optimal control", if time permits.

欢迎大家参加！