

数学与系统科学研究院

计算数学所学术报告

报告人: **Dr. Yuwei Fan**

(*Stanford University*)

报告题目:

**Deep neural network in numerical
PDEs**

邀请人: 周爱辉 研究员

报告时间: **2018 年 12 月 13 日(周四)**

下午 15:00-16:00

报告地点: **数学院南楼二层**

202 教室

Abstract:

With remarkable successes in many fields, the deep neural networks (DNN) have shown great capacity in approximating high-dimensional nonlinear maps. We use the DNN as a tool to solve parameterized PDEs by representing the map between the PDE coefficient and the solution. In order to construct a compressed DNN architecture for nonlinear pseudo-differential operators, we extended the concept of the multiscale method and multiresolution method, for example, hierarchical matrices, fast multipole method and nonstandard wavelet form in linear algebra to DNN. These new DNN architectures took full advantage of the data sparsity structure of the Green functions, thus compared with a fully connected convolutional neural networks, they have fewer parameters, are easier to train, and require less training data. Application on classical PDEs demonstrates the efficiency of these new architectures by approximating nonlinear maps that arise in computational physics and computational chemistry.

欢迎大家参加！