

数学与系统科学研究院  
计算数学所网络学术报告

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报告题目:

**Fokker-Planck Equations and  
Machine Learning**

邀请人: 周爱辉 研究员

报告时间: 2021 年 11 月 8 日 (周一)

上午 10:00-11:00

报告工具: 腾讯会议 (ID: 835 248 507)

## **Abstract:**

As the continuous limit of many discretized algorithms, PDEs can provide a qualitative description of algorithm's behavior and give principled theoretical insight into many mysteries in machine learning. In this talk, I will give a theoretical interpretation of several machine learning algorithms using Fokker-Planck (FP) equations. In the first one, we provide a mathematically rigorous explanation of why resampling outperforms reweighting in correcting biased data when stochastic gradient-type algorithms are used in training. In the second one, we propose a new method to alleviate the double sampling problem in model-free reinforcement learning, where the FP equation is used to do error analysis for the algorithm. In the last one, inspired by an interactive particle system whose mean-field limit is a non-linear FP equation, we develop an efficient gradient-free method that finds the global minimum exponentially fast.

**欢迎大家参加！**