北京理工大學

数学与统计学院学术报告

Continuous-time Riemannian SGD and SVRG Flows on Wasserstein Probabilistic Space

报告人：易鸣洋 (中国人民大学)

时间： 2024年03月13日，16：30-17：30

地点： 北京理工大学良乡校区文萃楼E218

摘要： Recently, optimization on the Riemannian manifold has provided new insights to the optimization community. In this regard, applying it to the Wasserstein space is of particular interest, since optimization on Wasserstein space is linked to practical sampling processes. Generally, the standard (continuous) optimization method on Wasserstein space is Riemannian gradient flow (i.e., Langevin dynamics when minimizing KL divergence). In this paper, we aim to enrich the continuous optimization methods in the Wasserstein space, by extending the gradient flow on it into the stochastic gradient descent (SGD) flow and stochastic variance reduction gradient (SVRG) flow. By leveraging the property of Wasserstein space, we construct stochastic differential equations (SDEs) to approximate the corresponding discrete Euclidean dynamics of the desired Riemannian stochastic methods. Then, we obtain the flows in Wasserstein space by applying Fokker-Planck equation. Finally, the convergence rates of our Riemannian stochastic flows are proven, which match the results in Euclidean space.

主办单位：北京理工大学数学与统计学院
School of Mathmatics and Statistics, Beijing Institute of Technology