

北京师范大学 随机数学研究中心

学术报告

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题目: Replica symmetry breaking and landscape complexity for spin glasses

时间: 2024 年 3 月 4 日 (周一) 下午 15:00-16:00

地点: 后主楼 1220

摘要: In statistical physics, the study of spin glasses was initialized to describe the low temperature state of a class of magnetic alloys in the 1960s. The Sherrington-Kirkpatrick (SK) model is a mean field approximation of the physical short range spin glass model introduced in the 1970s. Starting in 1979, the physicist Giorgio Parisi wrote a series of ground breaking papers introducing the idea of replica symmetry breaking (RSB), which allowed him to predict a solution for the SK model by breaking the symmetry of replicas infinitely many times at low temperature. Since then, his method has been applied to study various complex systems, which eventually earned him the 2021 Nobel Prize in Physics. In this talk, I will first introduce Parisi's work and show that his prediction on infinite replica symmetry breaking holds at zero temperature for the more general mixed p-spin model. As an example for the application of Parisi's method, I will present Fyodorov and Le Doussal's prediction on the Hessian spectrum at the global minimum of locally isotropic Gaussian random fields. A partial solution will be provided via landscape complexity.