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Dyson Brownian Motion as a Wasserstein Gradient Flow

Abstract
The Dyson Brownian motion (DMB) is a system of infinitely many interacting Brownian motions with logarithmic interaction potential, which was introduced by Freeman Dyson '62 in relation to the random matrix theory. In this talk, we reveal that an infinite-dimensional differential structure induced by the DBM has a Bakry-Émery lower Ricci curvature bound. As an application, we show that the DBM can be realised as the unique Wasserstein-type gradient flow of the Boltzmann–Shannon entropy associated with sine_beta ensemble.