

Séminaire de Probabilités et Statistique

Mardi 8 février à 14h00

Salle Fizeau (5ème étage)

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*Graph Neural Networks on Large Random Graphs: Convergence,
Stability, Universality*

In this talk, we will discuss some theoretical properties of Graph Neural Networks (GNNs) on large graphs. Indeed, most existing analyses of GNNs are purely combinatorial and may fail to reflect their behavior regarding large-scale structures in graphs, such as communities of well-connected nodes or manifold structures. To address this, we assume that the graphs of interest are generated with classical models of random graphs. We first give non-asymptotic convergence bounds of GNNs toward “continuous” equivalents as the number of nodes grows. We then study their stability to small deformations of the underlying random graph model, a crucial property in traditional CNNs. Finally, we study their universality and approximation power, and show how some recent GNNs are more powerful than others.