Atelier d'été de Montréal sur les défis en probabilités et en physique mathématique
9 au 20 juillet 2018

Montreal Summer Workshop on Challenges in Probability and Mathematical Physics
July 9-20, 2018

On the Derrida-Retaux recursive model on trees

Yueyun Hu *

yueyun@math.univ-paris13.fr

This model was introduced by Derrida and Retaux (2014) as a simplified version of the hierarchical renormalization problem. This toy model turns out to be sufficiently complicated that many fundamental questions remain open. It can be defined by a simple max-type recursive equation on a binary tree:

$$X_{n+1} = \left(X_n^{(1)} + X_n^{(2)} - 1\right)^+,$$

where $X_n^{(1)}$ and $X_n^{(2)}$ are two independent copies of X_n. When X_n takes values in the set of nonnegative integers, the critical regime was determined by Collet, Eckmann, Glaser and Martin (1984). We shall present some quantitative results on the free energy in the nearly supercritical regime and discuss some open questions.

The talk is based on some joint works with Xinxing Chen (Shanghai), Bernard Derrida (Collège de France), Mikhail A. Lifshits (St. Petersburg) and Zhan Shi (Paris 6).

*Département de Mathématiques, Université Paris 13, 99 Av. J-B. Clément, 93430 Villetaneuse, Ile-de-France, FRANCE