1129-13-17 **Thomas Dreyfus*** (thomas.dreyfus@ens-cachan.org), **Charlotte Hardouin**, **Julien Roques** and **Michael Singer**. *On the nature of the generating series of random walks in the quarter plane.*

In the recent years, the nature of the generating series of the walks in the quarter plane has attracted the attention of many authors. The main questions are: are they algebraic, holonomic (solutions of linear differential equations) or at least hyperalgebraic (solutions of algebraic differential equations)?

This problem was first considered in a seminal paper, where Bousquet-Mélou and Mishna attach a group to any walk in the quarter plane and make the conjecture that a walk has an holonomic generating series if and only if the associated group is finite. They proved that, if the group of the walk is finite, then the generating series is holonomic, except, maybe, in one case, which was solved positively by Bostan, van Hoeij and Kauers. In the infinite group case, Kurkova and Raschel proved that if the walk is in addition non singular, then the corresponding generating series is not holonomic. This work is very delicate, and relies on the explicit uniformization of a certain elliptic curve. Recently, it has been proved that 9 over the 51 such walks have a generating series which is hyperalgebraic. In this talk, we will prove, using the difference Galois theory, that the remaining 42 walks, have a generating series which is not hyperalgebraic. (Received January 06, 2017)