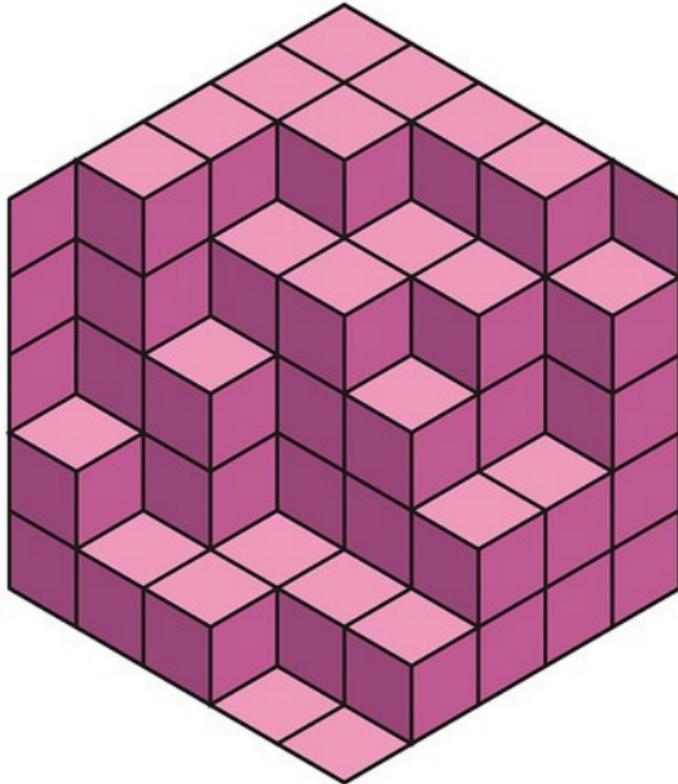


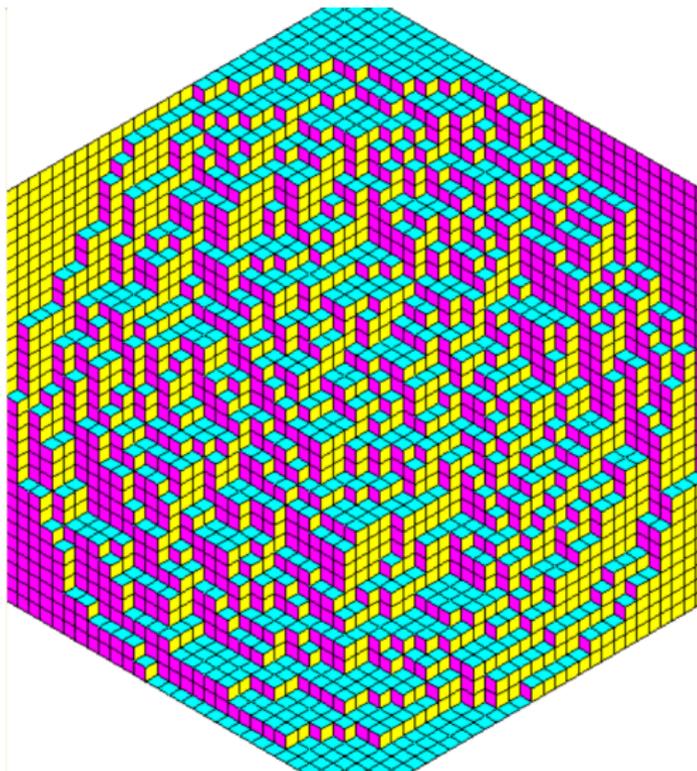
# Surfaces aléatoires, pavages, tableaux de Young, courbes arctiques

Philippe Marchal

# Pavage par des losanges



# Courbe arctique



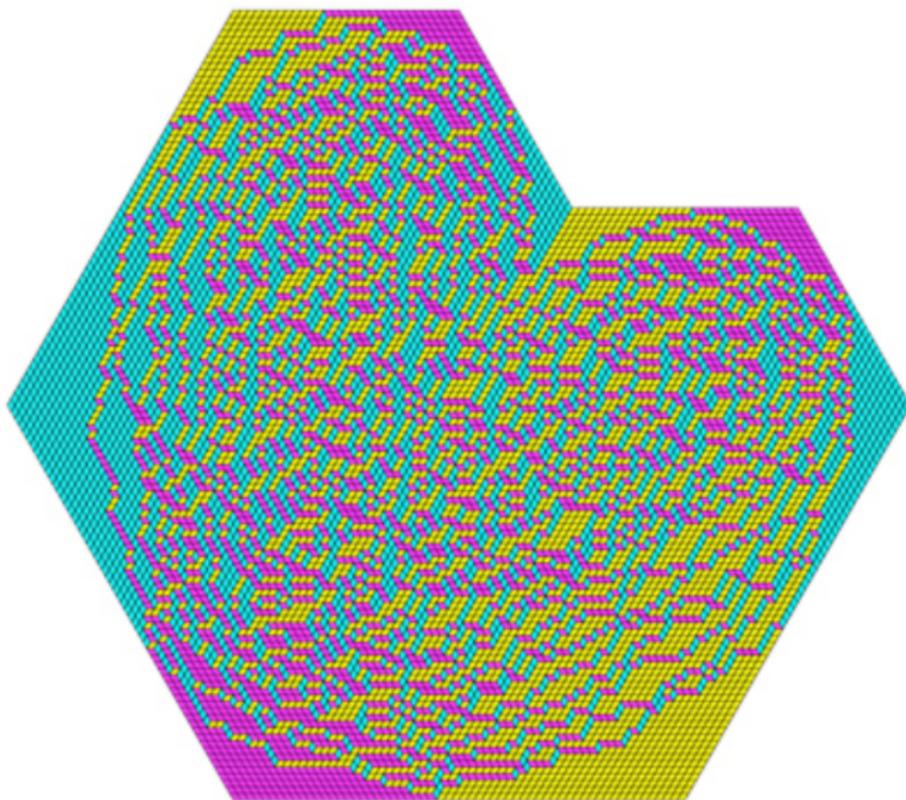
# Courbe arctique



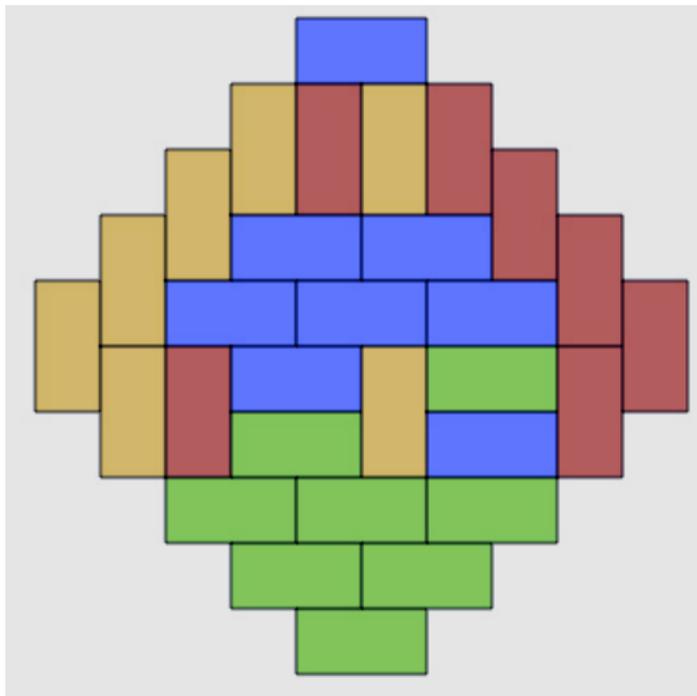
# Kenyon, Okounkov, Sheffield



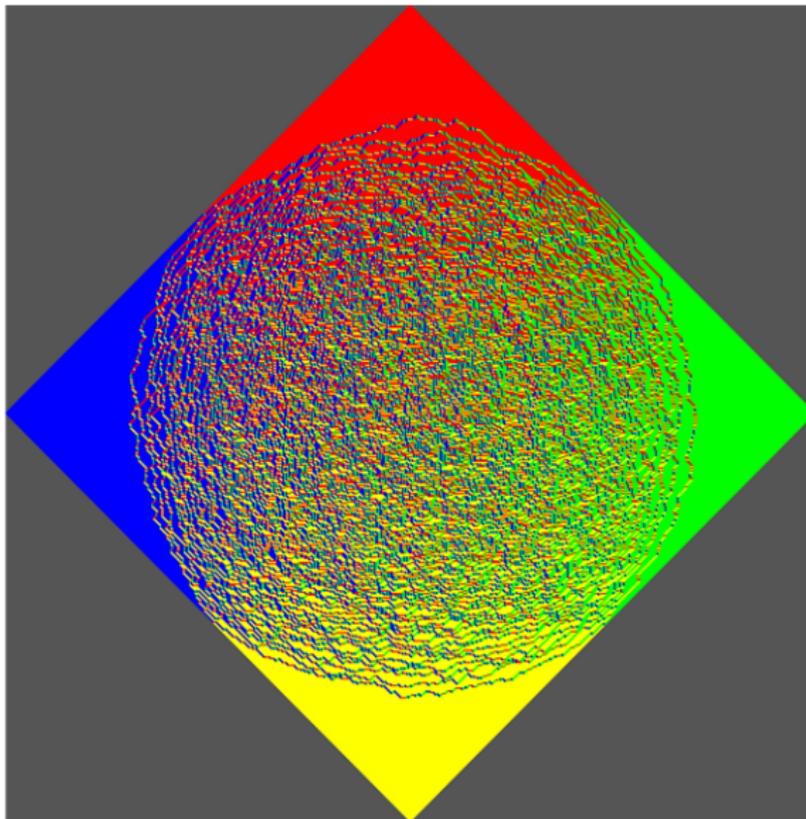
# Autres domaines



# Pavages par dominos



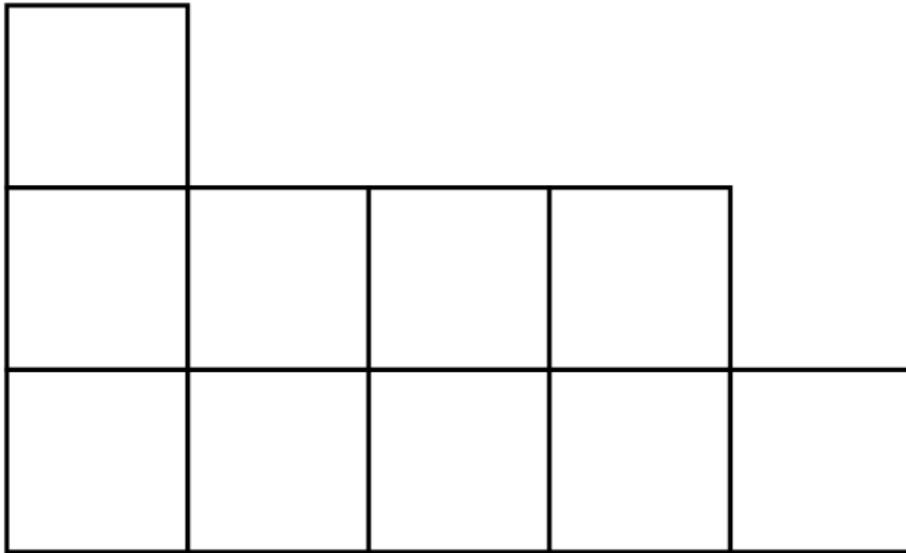
# Le diamant aztèque



# Elkies, Kuperberg, Larsen, Propp

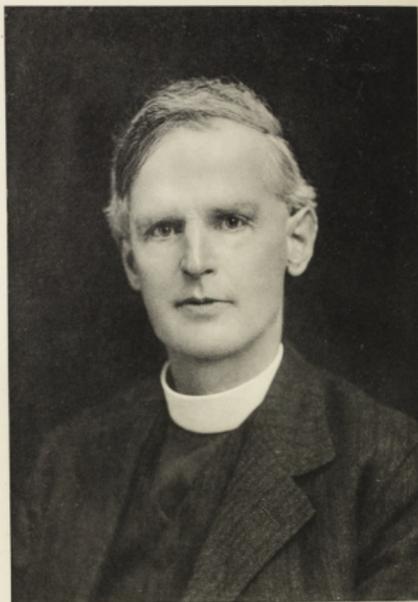


# Diagramme de Young



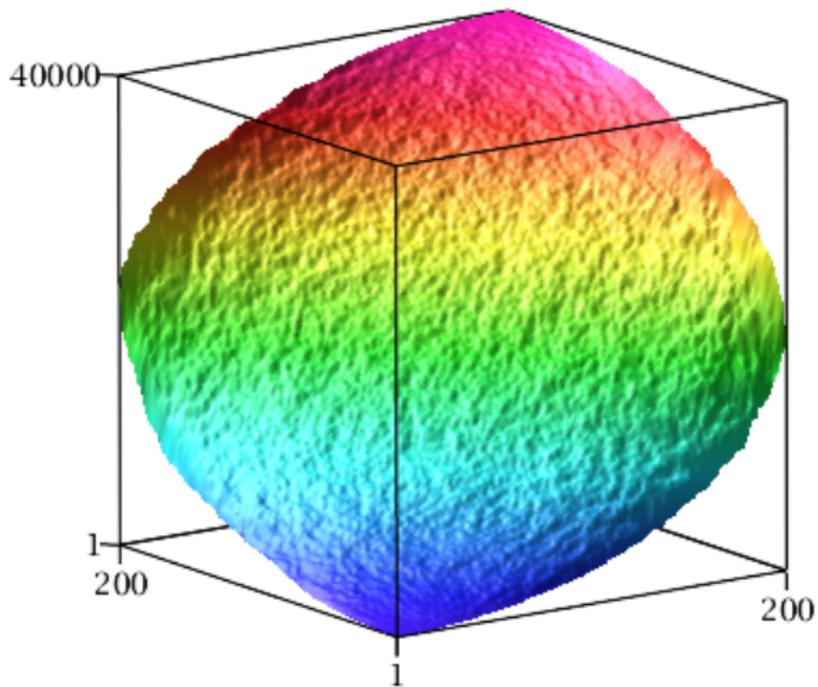
# Tableau de Young

4				
3	5	8	9	
1	2	6	7	10

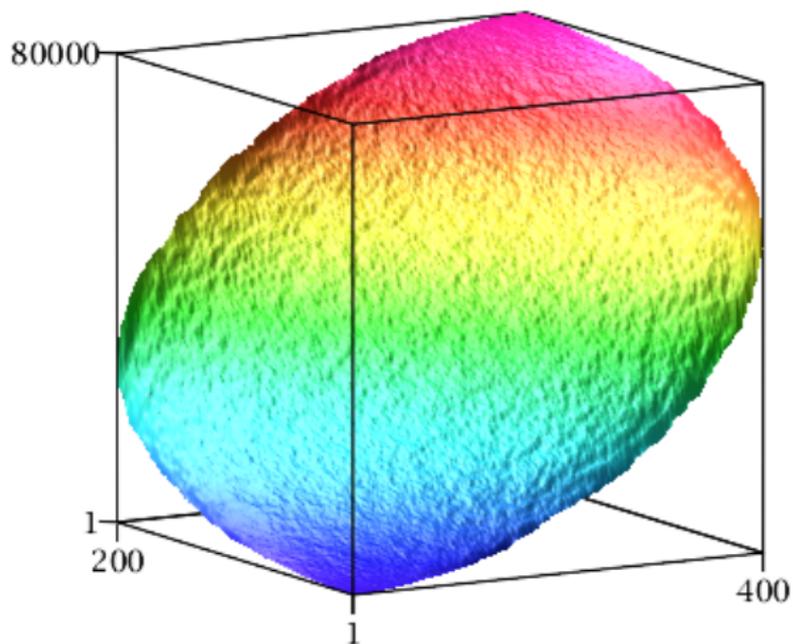


*Alfred Young*

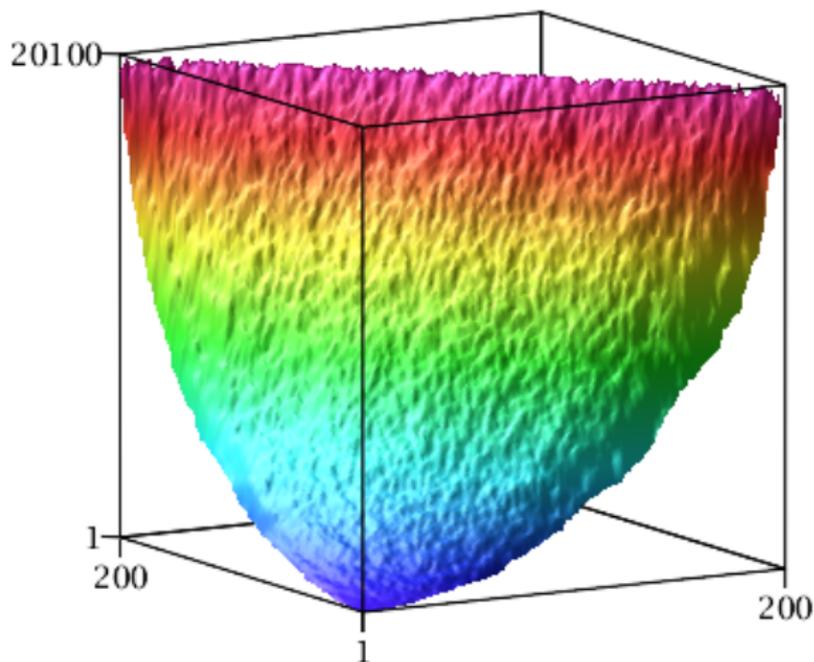
# Surfaces et tableaux de Young



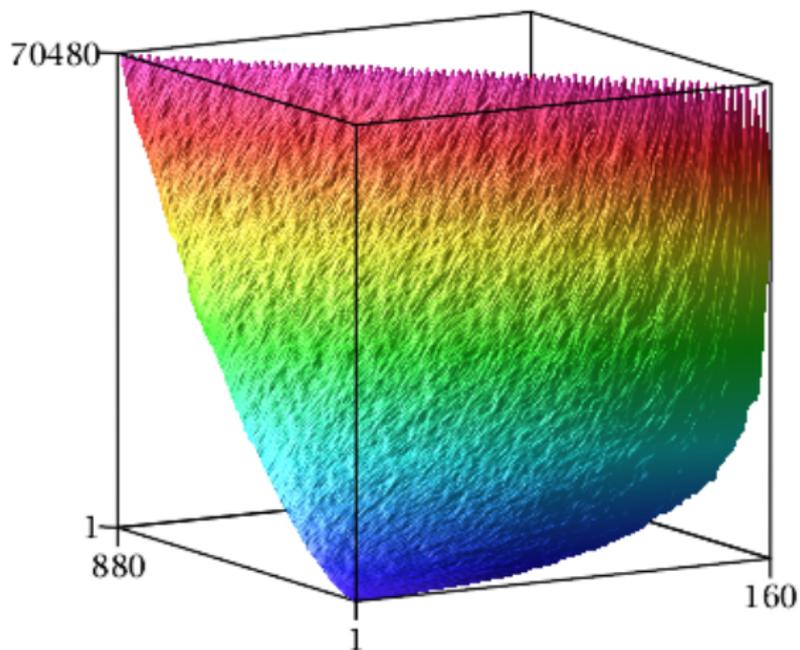
# Surfaces et tableaux de Young



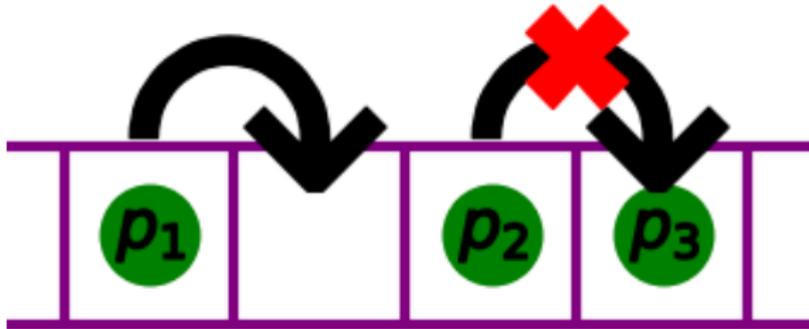
# Surfaces et tableaux de Young



# Surfaces et tableaux de Young



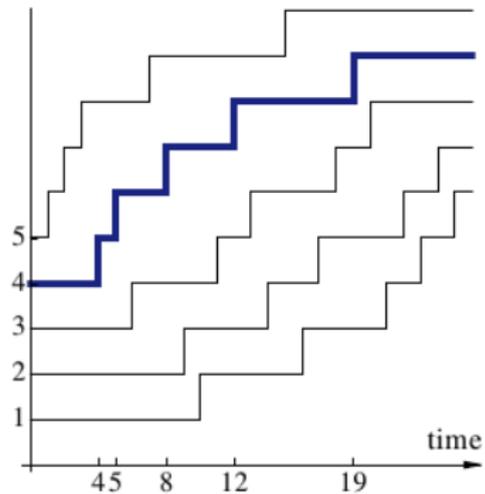
# Un système de particules : le TASEP



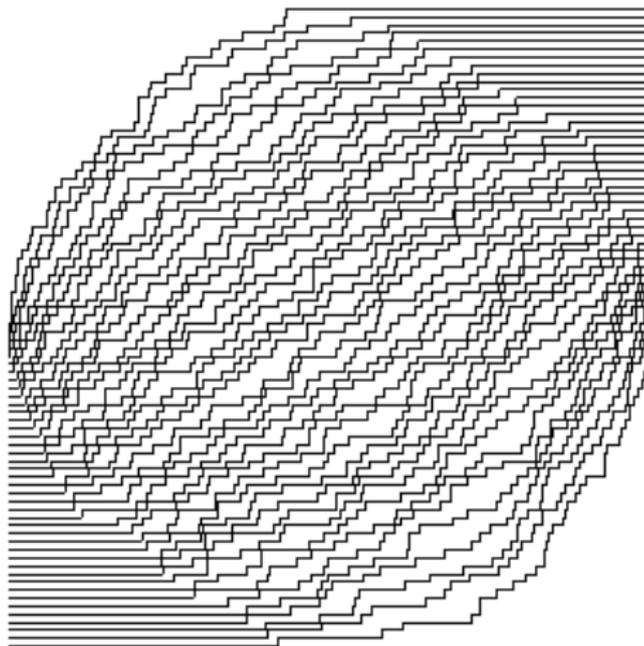
# Tableaux de Young et TASEP

10	16	21	23	25
9	14	17	22	24
6	11	13	18	20
4	5	8	12	19
1	2	3	7	15

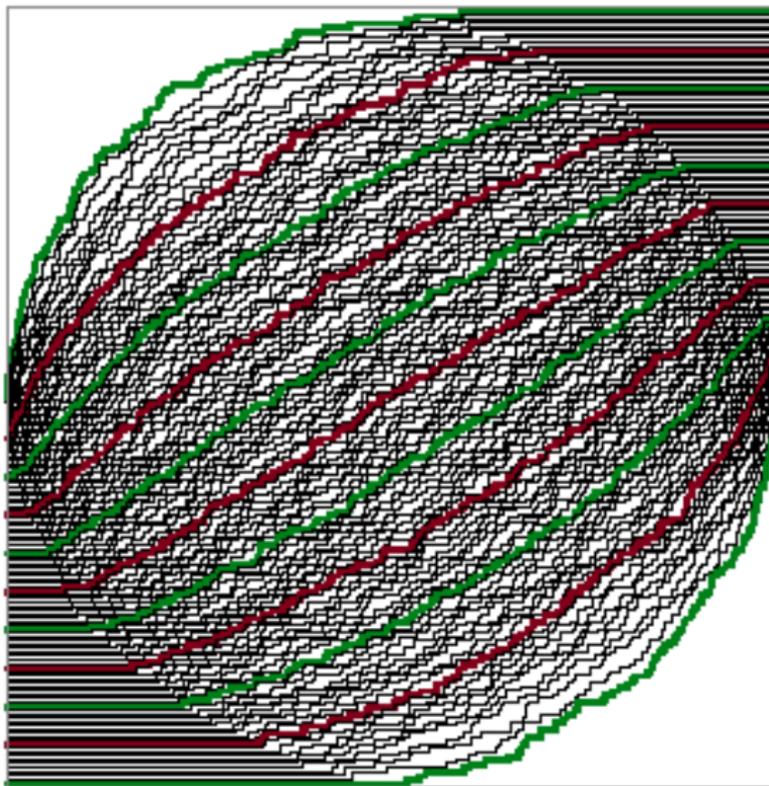
↔



# TASEP et courbe arctique

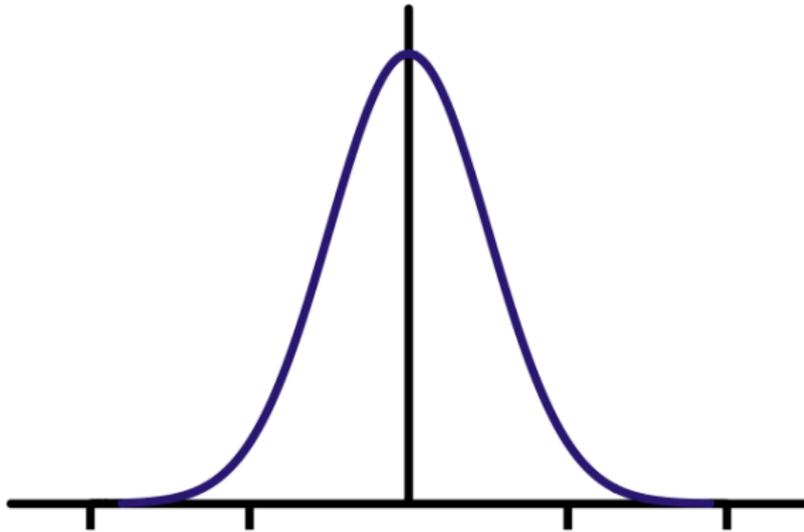


# TASEP et courbe arctique



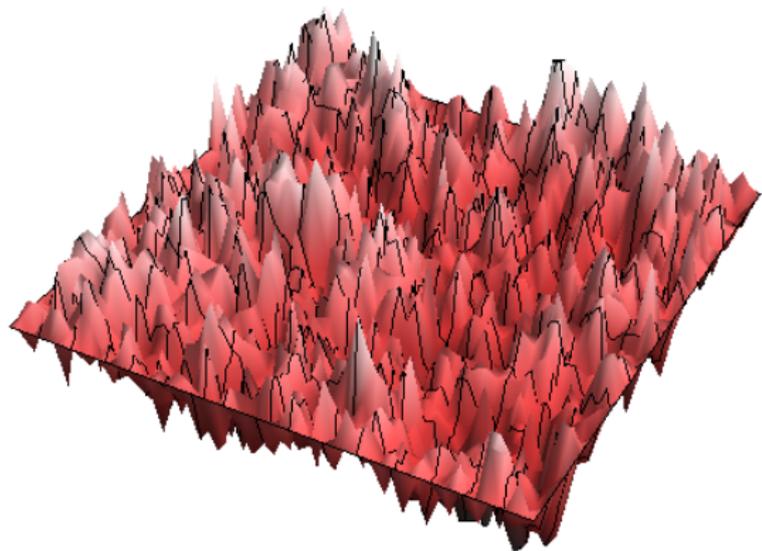


# Réels aléatoires : la loi gaussienne



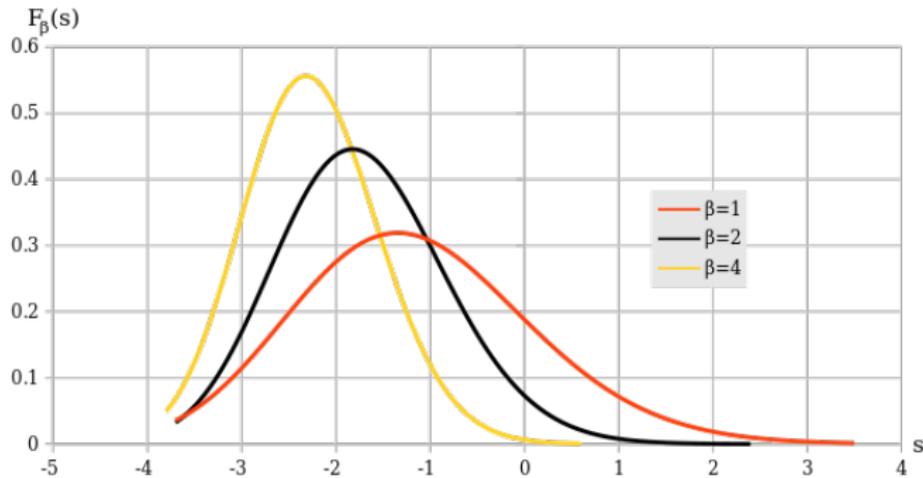


# Une “fonction” aléatoire $\mathbb{R}^2 \rightarrow \mathbb{R}$ : le champ libre gaussien





# Réels aléatoires : la loi de Tracy-Widom



q

# Tracy-Widom et Airy

The **cumulative distribution function** of the Tracy-Widom distribution can be given as the **Fredholm determinant**

$$F_2(s) = \det(I - A_s)$$

of the operator  $A_s$  on square integrable functions on the half line  $(s, \infty)$  with **kernel** given in terms of **Airy functions**  $\text{Ai}$  by

$$\frac{\text{Ai}(x)\text{Ai}'(y) - \text{Ai}'(x)\text{Ai}(y)}{x - y}.$$

It can also be given as an integral

$$F_2(s) = \exp\left(-\int_s^\infty (x - s)q^2(x) dx\right)$$

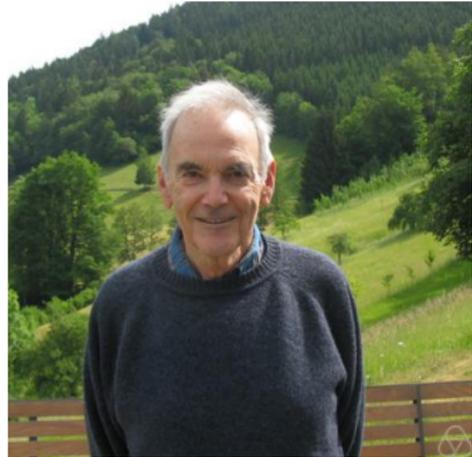
in terms of a solution of a **Painlevé equation** of type II

$$q''(s) = sq(s) + 2q(s)^3$$

where  $q$ , called the Hastings-McLeod solution, satisfies the boundary condition

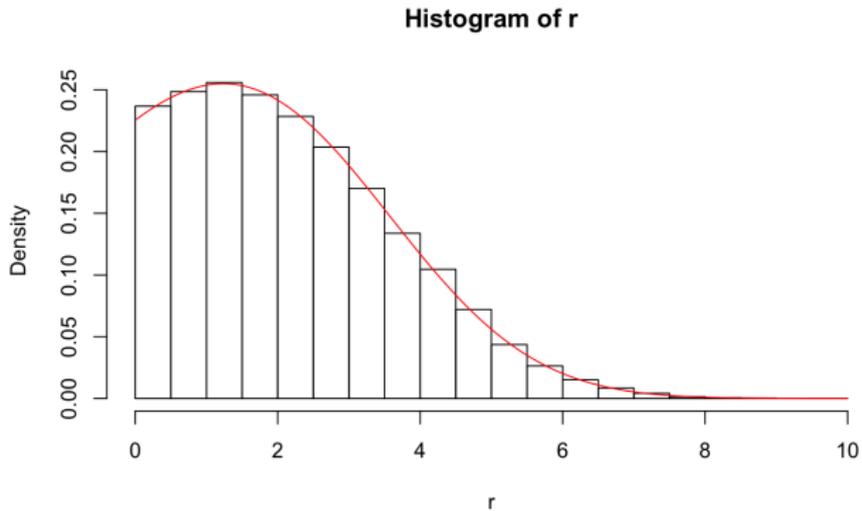
$$q(s) \sim \text{Ai}(s), s \rightarrow \infty.$$

# Tracy, Widom



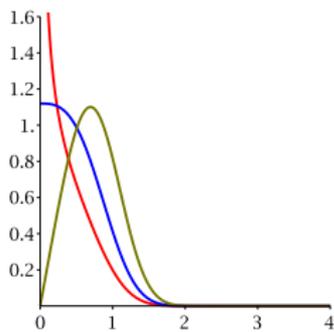
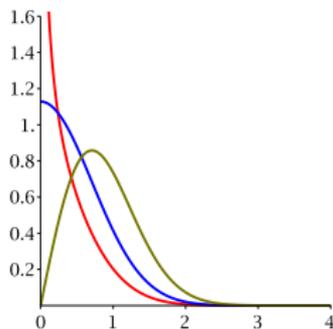
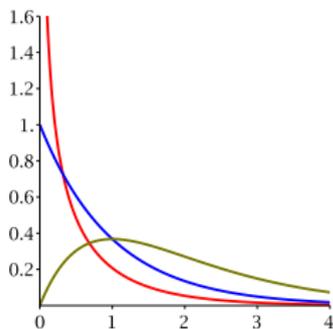


# Réels aléatoires : les lois de Mittag-Leffler





# Réels aléatoires : les produits de loi Gamma généralisées

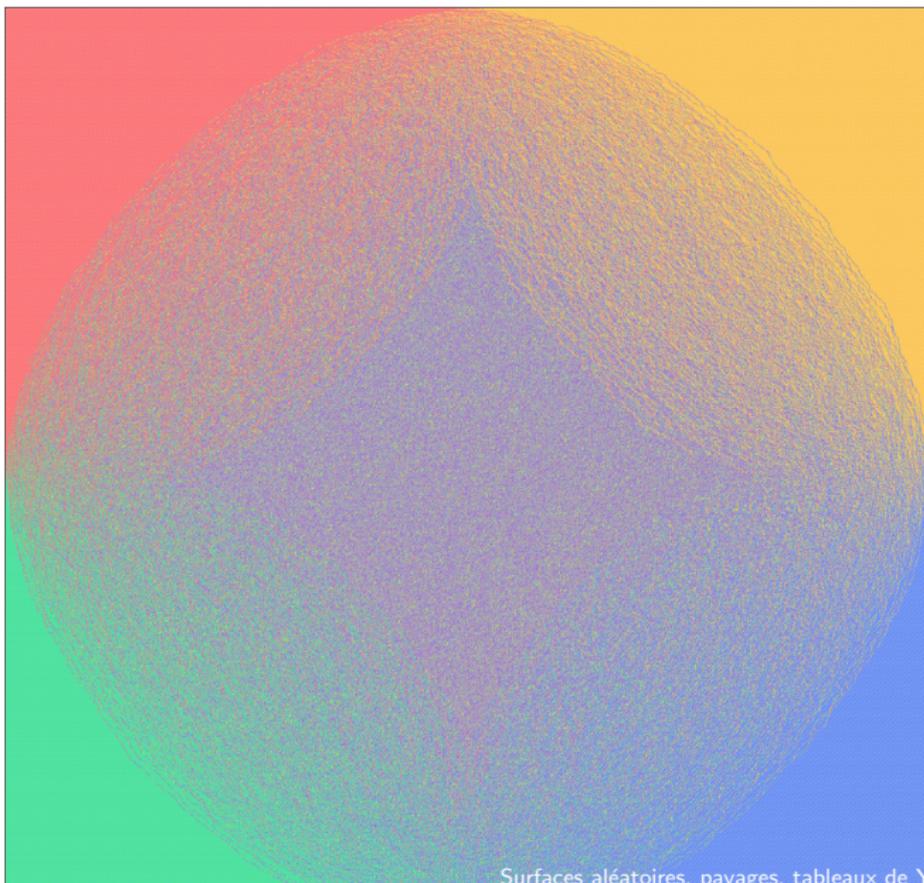


# Banderier, M., Wallner





# Phase gazeuse dans d'autres modèles



Surfaces aléatoires, pavages, tableaux de Y

# Beffara, Chhita, Johansson



