

# Cluster algebras and cluster monomials

Bernhard Keller

keller@math.jussieu.fr

*Université Paris Diderot — Paris 7, France*

## Abstract

Cluster algebras were invented by Sergey Fomin and Andrei Zelevinsky at the beginning of the year 2000. Their motivations came from Lie theory and more precisely from the study of the so-called canonical bases in quantum groups and that of total positivity in algebraic groups. Since then, cluster algebras have been linked to many other subjects ranging from higher Teichmüller theory through discrete dynamical systems to combinatorics, algebraic geometry and representation theory. According to Fomin-Zelevinsky's philosophy, each cluster algebra should admit a 'canonical' basis, which should contain the cluster monomials. This led them to formulate, about ten years ago, the conjecture on the linear independence of the cluster monomials. In this talk, we will give a concise introduction to cluster algebras and sketch the ingredients of a proof of the conjecture. The proof is valid for all cluster algebras associated with quivers and was obtained in recent joint work with G. Cerulli Irelli, D. Labardini-Fragoso and P.-G. Plamondon.

*AMS Classification: Primary 13F60; Secondary 17B20.*