DUNKL PROCESSES - FREEZING, JUMPS AND COLLISIONS

SERGIO ANDRAUS

Abstract

Dunkl processes are multidimensional Markov processes defined through the use of Dunkl operators. Their paths show discontinuities, and so they can be separated into their continuous (radial) part, and their discontinuous (jump) part. Radial Dunkl processes, also called multivariate Bessel processes, have been studied thoroughly due to their relationship with families of stochastic, log-interacting particle systems such as the Dyson model and WishartLaguerre processes. These systems are indexed by a parameter, β, which serves as a coupling constant of interaction, but which can also be understood as the inverse temperature. In this talk, we make a survey of the main results in the freezing limit, namely $\beta \to \infty$, the fluctuations around it, and we discuss the connections that appear with classical orthogonal polynomials. We also give a quick look at the jump part of Dunkl processes, we study their dynamical properties and their dependence on the radial part, and we find that the jump processes corresponding to the Dyson model and the Wishart-Laguerre processes undergo a phase transition when β decreases towards one in the bulk scaling limit (t N). Finally, we discuss the connection between this phase transition and particle collisions in these systems.

The University of Tokyo
E-mail address: sergio.andraus@phys.s.u-tokyo.ac.jp