Tunneling of reversible condensed zero range processes on finite sets.

Abstract:

Let $r(x,y)$ be the jump rates of an irreducible random walk on a finite set $S$, reversible with respect to some probability measure $m$. For some $a>1$, let $g$ be a function given by $g(k) = (k/k-1)^a$. We consider a zero range process on $S$ in which a particle jumps from a site $x$ occupied by $k$ particles, to a site $y$ at rate $g(k)r(x,y)$. Since $g$ is decreasing, the dynamics is attractive in the sense that particles on sites with a large number of particles leave them at a slower rate than particles on sites with a small number of particles. Let $N$ be the total number of particles. In the stationary state, as $N$ goes to infinity, all particles but a finite number accumulate on one single site. In our work we investigate the dynamical aspects of this condensation phenomenon. We show that in the time scale $N^{(1+a)}$ the site which concentrates almost all particles evolves as a random walk on $S$ whose transition rates are a multiple of the capacities of the underlying random walk.

This is a joint work with Claudio Landim.

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