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A random dynamics for the regional fractional laplacian with several boundary conditions

In this seminar I will describe the derivation of some partial differential equations that rule the space-time evolution of the density of a symmetric exclusion process. The goal is to describe the connection between the macroscopic (continuous) equations and the microscopic (discrete) system of random particles. The former can be either PDEs or stochastic PDEs depending on whether one is looking at the law of large numbers or the central limit theorem scaling; while the latter is a collection of particles that move randomly according to a transition probability. I will focus on a model for which we can obtain a collection of (fractional) reaction-diffusion equations given in terms of the regional fractional Laplacian with different types of boundary conditions. This is a joint work with Cédric Bernardin, Byon Jiménez-Oviedo and Stefano Scotta and it is based on the articles [1, 2, 3].

References

[1] Bernardin, C., Gonçalves, P., Oviedo, B., Slow to fast infinitely extended reservoirs for the symmetric exclusion process with long jumps, Markov Processes and Related Fields, no. 25, 217-274 (2019).

[2] Bernardin, C., Gonçalves, P., Oviedo, B., A microscopic model for the regional fractional Laplacian with Dirichlet boundary conditions, online at arxiv.org and submitted (2018).

[3] Bernardin, C., Gonçalves, P., Scotta, S., Hydrodynamic limit for a super-diffusive symmetric exclusion in contact with reservoirs, in preparation.