SCIENTIFIC REPORT ON SHORTVISIT TO HAIFA (ISRAEL)

LEIF DÖRING

Purpose of the Visit. Scientific collaboration with Prof. Dr. Leonid Mytnik from Technion.

The Scientific Tasks. We worked on a spatial branching system called "symbiotic branching model" and it's infinite branching rate relatives which we identified to be generalized voter processes in the sense that voters do not only have one of two possible opinions but additionally their opinion has a strength. We aimed at working on scaling invariances and the longtime behavior. For the scaling invariances we would like to prove a generalization of the classical convergence of Moran models to the Wright-Fisher diffusion. The longtime behavior is understood for two parts of the parameter regime but not for the most interesting part. We expect that interesting phase-transitions as known for the parabolic Anderson model with Brownian potential occur.

Results Obtained. We finished our work of generalizing recent results of Klenke/Mytnik on infinite rate mutually catalytic branching processes. In particular, we derived a generalization of infinite dimensional jump-type SDEs driven by Poisson random measures. The most striking feature of our generalization is that we found a smooth transition at one of the boundaries of the parameter space to the standard voter process which we used to interpret the infinite rate processes as generalized voter processes.
We can prove the conjectured scaling property for the simpler part of the parameter space but are stuck for the more interesting regime. The first conjecture that a recently found second moment transition leads to mutually catalytic branching driven by stable noise seems to be incorrect.
For the longtime behavior we identified the term in a possible proof which should lead to the phase-transition. So far we do not know how to derive from this a rigorous proof for our conjecture.

Future Collaborations. The main steps for proofs of our conjectures seem to be done. We hope to proceed soon and Leif Döring tries to visit Technion again in 2012.

Project Publications. We almost finished an article on the introduction and characterization of symbiotic branching with infinite rate. Support of RGLIS will be appreciated