

REPORT ON VISIT

In the period 9-15 October 2005 I visited the Department of Mathematics of Chalmers Institute of Technology Gothenburg. My host was Professor Jeffrey Steif with whom I work on a project related to problems of finite and infinite *exchangeable extendibility of various mean field models of statistical physics*. See professional details below.

I applied for support of my travel costs and local expenses from the ESF RDSES Program (submission date 01.06.2005) which was granted under ref. number 651.

Professional report

During my visit we worked intensively on the paper *Statistical Mechanical Models on Complete Graphs and Exchangeable Extensions* written jointly by Thomas M. Liggett, Jeffrey E. Steif and Bálint Tóth. In this work we show that the ferromagnetic Ising, Potts, Heisenberg (and other related) models on the complete graph can be extended to an infinite exchangeable process. By De Finetti's theorem this is equivalent to showing that these probability measures can be expressed as averages of constant density product measures. We also show that this is *not* a general feature of so-called mean-field models: allowing multi-spin ferromagnetic interactions the interaction parameters should satisfy more sophisticated constraints (depending on the system size) in order that the distributions be infinitely extendible. On the other hand: antiferromagnetic models are never infinitely extendible. For these models we give precise asymptotic conditions for finite exchangeable extendibility.

During my visit we made substantial progress in this project. The paper is in preparation and we expect to submit the final version within a few weeks time. The support of ESF RDSES will be certainly acknowledged in the paper.

Beside working on this project I also had interesting professional discussions with Professor Jeff Steif and Dr. Antar Bandyopadhyay on problems of self organized criticality and forest fire models, and with Professor Peter Jagers on randomly growing graph models and their relations to generalized branching processes.

On Thursday, 13 November I gave a one hour lecture in the joint seminar of the groups of probabilists and kinetic theorists at Chalmers mathematics department, on hyperbolic hydrodynamic limits of two-component systems of interacting particles.

I consider the visit a success and I thank the support offered by ESF RDSES.

Bálint Tóth