

Review

1. Scientific success of the project:

Contribution and importance of the work to the further development of the scientific discipline, any importance for related disciplines (transdisciplinary questions and methods), quality of the dissemination of the scientific results (publications, activities at conferences and so on)

Comments

The work of the team leader and his group has resulted in some very strong and interesting results concerning the interplay of probabilistic and analytic properties of random walks with the structure theory of the underlying state space. In particular, the results concerning lamplighter random walks and random walks on Diestel-Leader graphs add a wealth of new ideas and techniques, and present considerable extensions and simplifications of previous work. For example, the description of the Martin compactification given in [7] is the first for a random walk on a finitely generated, solvable group of exponential growth.

The scientific output of the group was quite high for research in pure mathematics, with many of the articles appearing in very good journals (as in the top journals for probability theory: Annals of Probability, Annales Inst. H. Poincare, Probab. Theory Rel. Fields)

2. Development of human resources in the course of the project

Improvement of the project leader's standing in the relevant scientific community; involvement of young scientists in the project work; development of international contacts

Comments

The involvement of young scientists into the project was excellent. As described very convincingly in the project report, the leading principle of the team leader was to hire the best candidate. This has clearly paid off and resulted in the participation of some outstanding young researchers and in a very productive output on a high level of the involved researchers.

Also the organization of and participation in conferences and the national and international collaboration was on a good level.

Woess had already been one of the internationally recognized leaders in the field of random walks on graphs and groups; this role was strengthened further by the project; in particular the very strong group of young researchers which was built up in recent years has clearly increased the international visibility of Woess and of Graz.

3. Effects of the project beyond the scientific field

(in the sense of applications in or impacts on social, cultural, ecological, medical, economic and/or technological areas)

Comments

As typical for projects in pure mathematics there is no direct application in or impact on social, cultural, etc. areas. In this sense, a rating is inappropriate.

4. Project performance (in the sense of efficient use of Available resources):

Were the goals achieved? Were changes to the original research plan sensible? What is the relation between the results obtained¹, the duration of the project and the resources available?

Comments

The performance was excellent. Almost all of the resources went into hiring excellent personnel, mostly on the postdoc level. Changes in the original research plan and level of hiring were always due to the strategy of hiring the best available candidate. It should also be pointed out that Woess could also secure other additional funds (e.g., a EU Marie Curie Fellowship for Sara Brofferio, visiting professor grants from TU Graz for Nagnibeda-Smirnova, Saloff-Coste, Zuk, Bartholdi, Kaimanovich) for researchers involved in the FWF project. I consider the ratio between scientific output (in quantity as well as in quality) and available resources as outstanding

5. Future perspectives of the research work:

Should the topic be pursued or should the scientists involved be advised to switch their attention to a different area? What goals does the referee feel should be set for future work?

Comments

The topic of random walk on graphs and groups and the interplay of probabilistic and analytic properties of random walks with the structure theory of the underlying state space should clearly be pursued further. There are still many interesting questions open for further research. In particular, the sub-topics (B), (C) and (D) of the original project proposal look still very promising. Woess has now built up a strong and vibrant group of researchers in this field, with many connections to other internationally leading experts. He has clearly the expertise to attack these questions successfully and I would strongly support a continuation of this funding.

¹ Please bear in mind that failure to achieve goals may sometimes also lead to significant findings.