

Opponent's Report on
Discrete Group Actions:
Algorithms and Applications
by Mgr. Ján Karabáš, PhD.

This work, submitted in support of an application for the rank of an *associate professor*, summarizes results concerning classification and enumeration of various classes of highly symmetric topological objects obtained by the author and his collaborators via an extensive use of computers. The thesis consists of an introduction of the problems considered, followed by four articles co-authored by Mgr. Karabáš. Two of the articles included in the work have already been published, the other two await publication or have been submitted.

The thesis makes the scientific contributions of the applicant abundantly clear. Mgr. Karabáš uses his proficiency with computers to help teams of researchers working on problems with large computational components. This is, in my eyes, a very special position. While the contributions of the 'computer person' are indispensable for the final results, he is personally involved only in a specific part of the project. Thus, writing a thesis that includes a description of the entire project puts Mgr. Karabáš into a somewhat uncomfortable position. As a result, the first half of the thesis reads like a check-off list of topics considered in the articles included in the second half. I am not convinced writing an introduction of this type was actually necessary. I would have liked it better, if he chose to considerably narrow the list of topics included, and focused on the computational aspects and the specifics of his own contributions.

Even though the text includes several examples of specific code and programs, the actual complexity of the calculations is very hard to assess. I am not talking about the computational complexity - a well defined concept from algorithmic computer science - but rather of the complexity of the entire process starting from choosing the computing machinery, choosing the appropriate software, all the way to the running time of the calculations. The author chose to leave out such details as is the strength of the computers used, the size of the problems, or the amount of time taken by the calculations. This, being the basis of his contributions, should have been the main focus of the submitted work; a welcome chance to explain issues that rarely make it into the final research paper. Throughout the text, I kept looking for an explanation of what was the main ingredient that allowed the authors to obtain results previously unobtainable by others: how much of the progress was due to better and faster computers and more advanced software, how much of it was due to the advancement of theory, and how much is owed to the author's better and more clever use of the tools at hand.

The thesis should have also included an outline of author's future projects or plans. A list of this kind would have certainly been helpful in assessing the scope of his activities and the strength of his involvement in scientific research. If the author intends to make his programs a part of a larger software package made available to others in the field (as I believe is the case), this should have been mentioned in the thesis.

The English of the first seventy pages of the text is not always perfect. It is, nevertheless, sufficient.

Despite all the above criticism (meant mostly as advise), I find the projects described in the thesis interesting, advancing our understanding of highly symmetric topological objects, and also advancing the use of computing machinery in the area. Based on the presented thesis, I believe the author's contributions are sufficient to grant him the promotion to the associate professor level.

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Doc. RNDr. Robert Jajcay PhD.
Comenius University, Bratislava
robert.jajcay@fmph.uniba.sk