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Title: Graphs Design and Algebraic Combinatorics
Event Type: Conference-Workshop

Location:
University of Regina, Regina SK

Dates:
July 18-21, 2011

Topic:
This was a conference in discrete mathematics with particular emphasis on design theory and graph theory but also with a focus on their connections from an algebraic perspective.

Methodology:
The conference consisted of one hour lectures by the invited speakers and half hour contributed lectures. We also had an open problem session. In this session three open problems were introduced and we split into three groups and worked on these problems. Some progress was made on two of the problems over the course of the conference.

Objectives Achieved:
The main objective of this conference was to bring together researchers in design and graph theory to share new methods, techniques, ideas, and results with an algebraic flavour. This conference served to establish connections between both individual researchers and between research areas. The first opportunity for establishing these connections was through the talks given by the speakers. We were able to have many talks, indeed half the participants gave lectures. The talks were consistently excellent and very accessible. After each talk there were many questions, discussion and suggestions. There were many graduate students and junior researchers at this conference, we were very fortunate to be able to fund some students which made it possible for them to attend. The conference was smaller and very friendly so most students were able to meet with more senior researchers. One aspect of this conference that worked very well is that we were able to have long lunch breaks and two informal social outings. We also held an open problem session early in this conference. Rather than simply suggesting several unsolved problems, we focused on three that were related to talks that had been given at the conference and actually worked on the problems in small groups. This proved to be an excellent opportunity for researchers to talk and work together.

Scientific Highlights:
The highlight of this conference was the excellent talks. We had six invited speakers and twelve contributed talks from researchers at all levels. The talks on each day were roughly related. The first day, Monday, focused on matrix theory. On Tuesday all the lectures were on design theory. The lectures on Wednesday morning focused on algebraic graph theory while in the afternoon we

had three lectures on the Erdos-Ko-Rado theorem. The last day we had two lectures on graph theory. Abstracts are available in the attached program and many of the slides from the talks are available on the conference website. Another major highlight of this conference was the problem session. Not only did this allow the researchers to work together and get to know one another, but some progress was made on these problems. For example, one of the problems given in the open problem session had to do with finding small resolving sets for a family of Johnson graphs. Dr. Stevens suggested a slight improvement on the current construction, but more importantly a generalization of the problem was suggested and it was agreed that the generalization would make an interesting problem. Another problem from the session posed by Dr. Brualdi was solved by Darcy Best, a masters student from the University of Lethbridge. An interest developed in the problems given in this session and I suspect that some of the conference attendees will continue to work on them when they return home. One aspect of the conference that worked well was that we had long catered lunches to allow the attendees a chance to talk and work together. Indeed, each day there was active conversation after lunch and after the final talk of the day. It is hard to know what other connections were made and what research will come out of this conference but we can give some examples. -Dr. Bailey and Dr. Martin started a collaboration on a paper. -A graduate student from the University of Waterloo showed an interesting problem to Dr. Martin and Dr. Meagher. Dr. Martin was able to give a partial solution. -Dr. Brualdi had an excellent suggestion for a new direction in the research work a Ph.D. student of Dr. Meagher from the University of Regina. The student's work is also closely related to a problem that Dr. Dukes worked on which Dr. Meagher and Dr. Dukes discussed.

Organizers:
Bailey, Robert, , Mathematics and Statistics, University of Regina Fallat, Shaun , Mathematics and Statistics, University of Regina Meagher, Karen, Mathematics and Statistics, University of Regina

Speakers:
see attached file

Links:
http://www.math.uregina.ca/~gdac2011/

File Uploads:
Additional Upload 1: http://www.pims.math.ca/files/final_report/GDACprogram.pdf
Additional Upload 2: http://www.pims.math.ca/files/final_report/GDACposter.pdf