

C O M B I N A T O R I C S

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1. Director's report.

The total membership of the Society is 102.

At the 12th ACCMC there are 48 participants of whom 31 are presenting papers. There are 7 invited speakers.

I gratefully acknowledge financial and other assistance from the following in organising the 12th ACCMC:

The Australian Mathematical Society
The Mathematics Department,
University of Western Australia
The Mathematics Department,
University of Adelaide
The School of Mathematics & Computing,
Western Australian Institute of Technology
Trans Australian Airlines
The Westpac Banking Corporation
The Western Australian Department of Tourism
The University of Western Australia
Mr Douglas Rogers

I thank Professor Ralph Stanton for his clear and efficient directions in organising the publication of the proceedings of this 12th ACCMC.

Finally I thank the members of the organising committee for taking on their share of the organising chores for this conference (Drs Lloyd Alison, Lou Caccetta, Tom Dickson, Phill Schultz, Bob Sullivan and Vijayan), and I thank Messrs Trevor Gilham, Gordon Royle and Shaun Martin for their help during the conference.

Cheryl E. Praeger
August 1984

2. Minutes of the Annual General Meeting of the Combinatorial Mathematics Society of Australia.

4 p.m., August 16, 1984, Engineering Lecture Room 1, University of Western Australia.

1. Moved Breach, seconded Casse:
That the minutes of the 1983 A.G.M. be accepted.
Passed.
2. Matters arising from 1983 Minutes (apart from link with Australian Mathematical Society) - none.
3. Director's report - accepted.

4. Financial report. The Director pointed out that this is an unaudited Interim report. There was some discussion on whether surplus funds in New Zealand should be used to support young participants in N.Z. However it was agreed that the funds should be transferred to Australia.

B.H. Neumann, supported by J. Seberry suggested a permanent treasurer. There seemed to be general agreement on this but no resolution was made.

Moved Breach, seconded Seberry that the 1983 and 1984 reports be audited together. Passed.

Moved Schultz, seconded Holton that the Financial Report be received. Passed.

5. (a) 1985 Conference. Moved Praeger, seconded Neumann that J. Seberry be appointed Director of the 1985 Conference, to be held in Sydney.
Passed.
J. Seberry reported on progress in organising Conference for the last week in August.
- (b) 1986 Conference. D. Holton to enquire about holding Conference in Melbourne.
1987 Conference. B. McKay proposed a 2-week International Conference in Canberra, to be supported by the Australian Academy of Science. This was moved, seconded and passed.
- (c) Mathematical Sciences Congress, 1988. There was considerable discussion about participation in this Congress, to be held May 16-20 at A.N.U.
It was eventually moved that the Society participate in the Congress, but with no restriction on the normal annual conference in August 1988.
Passed; 24 for, 2 against.

6. Publication of conference proceedings: The Director raised the matter of publishing future proceedings in the Lecture Notes of the Aust. Math. Soc. series. There was considerable discussion about: speed and reliability of publication, control of refereeing, the advantage of publishing in an established continuing journal (*Ars Combinatoria*), circulation of a new series, waiting to see how the Lecture Note Series performs, and not changing a publisher unless necessary.

Moved from the chair that publication remain with *Ars Combinatoria*. Passed.

7. Link with Australian Mathematical Society. The Director outlined a proposal for the Society to become a Special Interest Group of the A.M.S., and proposed some Rules of Procedure for discussion.

Dr W. Bloom, secretary of the Aust. Math. Soc. outlined the advantages, both to the Society, and to mathematics in general, of accepting the proposal.

There was considerable discussion about the Rules of Procedure, particularly having two classes of members, which was generally opposed. It was moved W. de Launey, seconded J. Dawson that Rule III, 5 & 6 be changed to omit any mention of different classes of membership, with appropriate changes to the other rules. This motion was later withdrawn.

On the principle of acceptance, the following spoke in favour: B.H. Neumann, A. Street, J. Sefridge.

The following spoke against: W. Wallis, R. Casse, W. de Launey.

Moved Neumann, seconded Holton: that the Society accept in principle the status of special interest group of the A.M.S.

Amended McKay, seconded Godsil, that the motion include the words "subject to the principle that there be only 1 class of membership".

The amendment was put and passed.

J. Seberry spoke strongly against the amended motion.

The motion was passed 15 to 11.

J. Seberry foreshadowed a rescission motion to be brought up at the next A.G.M.

Moved Neumann, seconded Robinson that a small committee be appointed to examine and amend the proposed rules of procedure. Passed.

The following committee was nominated and accepted: B.H. Neumann, C.E. Praeger, J. Seberry, W. Wallis.

8. B.H. Neumann proposed a vote of thanks to the Organising Committee. Passed.
9. The meeting closed at 6.05 p.m.

3. Financial Statement.

The financial statements for the years 1983 and 1984 will be jointly audited when the receipts etc. arrive from New Zealand. I hope that the next newsletter will contain the details.

4. Proposed Rules of Procedure for a Special Interest Group within the Australian Mathematical Society.

This is a copy of the document discussed at the recent A.G.M. with references to different classes of members omitted. It is printed here for interest, and members of the subcommittee (B.H. Neumann, C.E. Praeger, J. Seberry, W.D. Wallis) would welcome comments from CMSA members about it.

I. Introduction

1. The following Rules are to be read in conjunction with the constitution of the Australian Mathematical Society, in the sequel to be referred to as the Society.

II. Name, Objects and Composition of the Group

2. The Group shall be called the "Combinatorial Mathematics Society of Australasia", hereafter to be referred to as the Group.
3. The objects of the Group shall be to promote combinatorial mathematics in Australasia.
4. To further these objectives the Group may, (among other activities):
 - (a) conduct regular meetings and conferences including an annual conference,
 - (b) publish the proceedings of appropriate conferences, and meetings as well as other material related to the work of the Group,
 - (c) disseminate information about combinatorics and combinatorialists through its newsletter.
5. Members of the Group shall be those persons who pay an annual membership fee to the Group.

III. Officers and Executive Committee

6. The Officers of the Group shall be Members of the Group. The Executive Committee shall be Members of the Group, the composition of the Executive Committee to be subject to the provisions of Paragraph 8.
7. The Officers of the Group shall be a Chairman, a Secretary and a Treasurer.
8. The Executive Committee of the Group shall consist of the Officers abovementioned, the Conference Director defined in Paragraph 16, and a representative of the Society nominated by the Council of the Society.
9. The Executive Committee shall manage the business of the Group and shall act to further the objects of the Group.
10. The Chairman or his nominee shall preside at all meetings of the Executive Committee. Three members of the Executive Committee shall constitute a quorum.
11. The Secretary shall keep a record of the activities of the Group and of the Executive Committee, and shall do all such things for the use and service of the Group as pertains to that office. The Secretary shall annually submit a written report on the activities of the Group to the Annual General Meeting of the Group, and the Council of the Society.
12. The Treasurer shall collect and receive all funds on account of the Group and shall deposit the same in an interest bearing Account established in the name of the Group. Payments from the Account shall be made by cheques signed by the Treasurer and one other person nominated by the Executive Committee. The Treasurer shall keep true accounts of the sums of money received and expended by the Group and shall annually submit an audited financial statement to the Annual General Meeting of the Group and to the Council of the Society. The annual financial statement shall be made available to any Member of the Group on request.
13. All members of the Executive Committee shall act in an honorary capacity.

IV. Annual Conference, Conference Director

14. There shall be an Annual Conference.
15. The Director of the Conference shall be a Member of the Group.

16. The Director shall form by cooption of members an Organizing Committee.
17. The Organizing Committee shall consist of the Director (as convener), a Conference Secretary, a Conference Treasurer, and other members as the Director sees fit.
18. Members of the Organizing Committee shall be Members of the Group.
19. The Organizing Committee shall make all arrangements for the Annual Conference, including arrangements for the publication of the Conference Proceedings.
20. The Organizing Committee shall be responsible for the preparation and distribution of the newsletter of the Group.
21. (a) Where fees are to be charged to cover expenses involved in the organization and conduct of the Conference, Members of the Group may pay a discounted fee as determined by the Executive Committee.
- (b) In matters relating to attendance at the Conference, the Group shall extend appropriate courtesies, as determined by the Executive Committee, to Honorary Members of the Society.
- (c) In matters relating to publications of the Group, the Group shall extend appropriate courtesies, as determined by the Executive Committee, to Institutional Members of the Society.
22. The Conference Treasurer shall submit a financial statement covering the financial arrangements of the Conference to the Executive Committee within three months of the conclusion of the Conference. The Conference Treasurer shall send any outstanding monies from the Conference to the Treasurer of the Group within three months of the conclusion of the Conference.

V. Elections and Meetings

23. The Annual General Meeting of the Group shall take place at the Annual Conference. The Chairman shall be the Chairman of the Group or his nominee.
24. A quorum at a General Meeting of the Group shall be ten members of the Group.

25. Any contentious issue shall be determined by a simple majority vote of the Members present, except that an amendment of the Rules of Procedure of the Group, or the termination of the Group shall be subject to the provisions of Paragraphs 34-36.
26. The positions of Chairman, Treasurer, Secretary, shall be declared vacant at the Annual General Meeting of the Group every (second) year.
27. The Chairman, Treasurer, and Secretary, shall be elected for a period of one (two) year(s) by Members of the Group.
28. The Director of the Conference shall be elected by Members of the Group.
29. Such elections abovementioned shall take place at the Annual General Meeting of the Group and shall be a simple majority vote of those present.
30. Nominations for any or all of the Officers or Director may be made by any two Members of the Group provided that the nominations reach the Secretary before the Annual General Meeting.
31. Persons elected as Officers or Director shall normally take up their positions immediately after the Annual General Meeting.
32. The Executive Committee shall decide whether to fill casual vacancies on the Executive Committee, or in the position of Director should they occur. Such vacancies shall be filled by appointment by the Executive Committee.
33. In the extraordinary case where no election of Officers has taken place by January 31st of a (post-election) year the Council of the Society shall intervene and take whatever action it deems appropriate.

VI. Amendment of Rules and Termination of the Group

34. Notice of intent to amend the Rules or to terminate the Group must be posted to the Members of the Group one Calendar month before the Annual General Meeting or before a Special General Meeting convened for one of those purposes.
35. Any motion to amend the Rules or to terminate the Group shall be decided by vote at a General Meeting of the Group and shall require a two-thirds majority to be passed.
36. In the event of the group being terminated all residual funds and assets of the Group shall be donated to the Australian Mathematical Society.

5. 1986 Conference: in Singapore?

Derek Holton has written to me about the possibility of holding our Conference in 1986 in Singapore. This has the support in principle of the National University of Singapore, and I hope I am not out of order in quoting part of a letter to Derek from Dr C.C. Chen:

"Your ideas of holding a joint conference by combinatorialists in Australasia and S.E. Asia is a wonderful one. I have talked to Professor H.H. Teh and other colleagues in our Department and all of us welcome very much the suggestion. Next year, we have already planned a graph theory conference to be held in Tokyo, which may not be a suitable location for a joint conference. Hence, Professor Teh has tentatively suggested that we have one here in either May or August, 1986, on "Information Processing and Combinatorial Mathematics". Please bring this up in your annual conference in Perth, and suggest to us how you think the combined meeting should be held! Meanwhile, we shall also try to get the approval from our University for such a meeting as soon as we can."

Dr Chen's letter arrived too late for this to be discussed in Perth. It is important that anyone with objections to holding the 14th ACCMC outside of Australasia (for example problems of finance) write to Dr Derek Holton, Department of Mathematics, University of Melbourne, Parkville 3052 as soon as possible. There is some urgency because of the need to consider invited speakers etc.

6. Report on the First International Conference on Fibonacci Numbers and their Applications.

This specialist Conference was held at the University of Patras in the Peloponnese region of Greece during the period 27-31 August, 1984.

Representatives from about 15 nations participated in the Conference and offered over two dozen addresses on a variety of topics which included Number Theory (Combinatorial, Algebraic, Classical), Graph Theory, Electrical Applications, Probability and Statistics, and Geometry.

Speakers and their national affiliations were, in alphabetical order, as follows, where the name(s) in brackets for a joint paper refers to the non-speaker(s):

Antoniadis, J.A. - Crete (Greece)
 Bong, N.H. - Malaysia
 Freitag, Herta T. - U.S.A.
 Hirano, K. - Japan
 Horadam, A.F. (Mahon, J.M.) - Australia
 Horadam, A.F. (Shannon, A.G.) - Australia
 Jaruskova, Daniela - Czechoslovakia
 Kirschenhofer, P. (Prodinger, H., Tichy, R.F.) - Austria
 (Kiss, P.), Pethö, A. - Hungary
 Lahr, J. - Luxemburg
 (Mahon, J.M.), Horadam, A.F. - Australia
 Markatos, K.M. - Greece
 Papastravrides, S. - Greece
 Pethe, S. - Malaysia
 Pethö, A. - Hungary
 Philippou, A.N. - Greece
 Philippou, G.N. (Georghiou, C.) - Cyprus (Greece)
 Phillips, G.M. - Scotland
 Popov, B.S. - Yugoslavia
 Rotkiewicz, A. - Poland
 Somer, L. - U.S.A.
 Tichy, R.E. - Austria
 Tsangaris, P., Zachariou, A. - Greece
 Kekalaki, Evdokia (Philippou, A.N., Panaretos, J.) -
 Crete (Greece)
 Zachariou, A. - Greece

Other participants from, e.g. Italy, Australia and the U.S.A., did not present papers.

7. Report of a "Combinatorial Corroboree" held at the University of Melbourne, September 28th.

There were four speakers; Derek Holton, Derrick Breach, Roger Eggleton and Tony Gardiner. Here are the titles, and abstracts for three of the talks.

Derek Holton (University of Melbourne)

"CYCLING"

Derrick Breach (University of Canterbury)
and Anne Penfold Street (University of Queensland)

"IRREDUCIBLE DESIGNS FROM SUPPLEMENTARY DIFFERENCE SETS"

Some 2-designs can be made by taking D_1, D_2, \dots, D_n all of size k as starter blocks from which all blocks are developed through addition modulo v . The sets D_1, D_2, \dots, D_n are called supplementary difference sets and the resulting design is cyclic. A family of difference sets is said to be minimal if no proper subfamily leads to a cyclic design modulo v . A cyclic design from a minimal family of supplementary difference sets may however contain a subdesign which is not cyclic in which case the design is reducible. Conditions under which this can happen will be discussed.

* * * * *

Roger Eggleton and Wal D. Wallis (University of Newcastle)

"HAMILTONIAN CYCLES AND EQUIDISTANT PERMUTATION SEQUENCES"

Let $G(n, \lambda)$ denote the graph with vertex set comprising all the $n!$ permutations on a given set of n symbols, and edges between all pairs of permutations which agree on λ of these symbols. In all possible cases we construct sequences of permutations which correspond to hamiltonian cycles in $G(n, \lambda)$.

* * * * *

Tony Gardiner (University of Birmingham)
and Cheryl E. Praeger (University of Western Australia)

"IMPRIMITIVE GRAPHS"

Any symmetry of the triangular prism must either leave the two triangular faces invariant or interchange them. Any symmetry of the cube merely permutes the four pairs of "opposite" vertices (the ends of the four body diagonals). A vertex-transitive graph Γ is imprimitive if the vertex set $V\Gamma$ can be partitioned $V\Gamma = B_1 \cup B_2 \cup \dots \cup B_n$ in such a way that any automorphism of Γ merely permutes the sets B_i .

Most vertex-transitive graphs are imprimitive. The theory of permutation groups treats imprimitive graphs as "degenerate". As a result we know almost nothing about the structure of such graphs. Yet there is good reason to think that their imprimitivity should have interesting combinatorial consequences. I shall give an introduction to the general problem, and give a complete analysis of one extremal case.

8. Combinatorial Mathematics Society of Australasia
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