

Proceedings of the

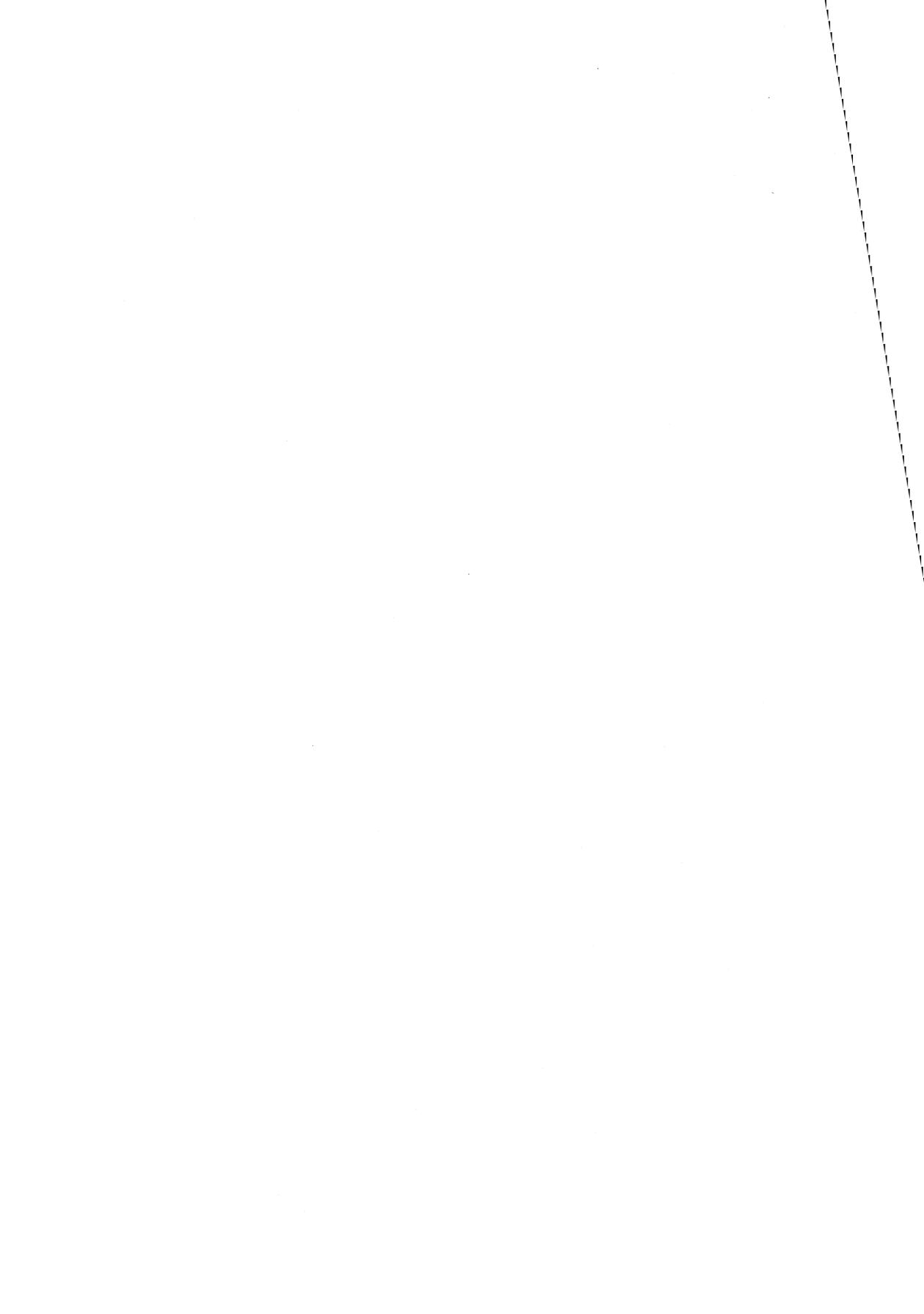
CENTRE FOR  
MATHEMATICAL ANALYSIS

AUSTRALIAN NATIONAL UNIVERSITY

Volume 20, 1988

**Workshop/Miniconference on  
Functional Analysis/Optimization  
(Canberra August 8-24, 1988)**

Edited by Simon Fitzpatrick  
and John Giles



**Proceedings**  
**of**  
**The Centre for Mathematical Analysis**  
**Australian National University**  
**Volume 20, 1988**

Workshop/Miniconference on  
**FUNCTIONAL ANALYSIS and OPTIMIZATION**  
*(Canberra, 8-24 August, 1988)*

Edited by

S.P. Fitzpatrick and J.R. Giles

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## PREFACE

This volume of the *Proceedings of the Centre for Mathematical Analysis* contains papers by participants in the Workshop/Miniconference on Functional Analysis/Optimization held in Canberra in August, 1988. Some of the papers were prepared beforehand and were presented at the Miniconference. But importantly, some have resulted from collaboration which occurred there in response to problems raised in the sessions; this is the special return from the prolonged Workshop experience.

The theme of the Workshop/Miniconference was Functional Analysis/Optimization and although most participants worked in one or other of the two areas, a small group worked in both. The pervasive influence of Rockafellar and Clarke meant that in many cases we all had some familiarity with the tools used by each other so there was more unity than might have been expected. Although the papers in this volume are easily identified as being in one of the two areas, a commonality of background is often evident.

We wish to thank the Centre for Mathematical Analysis for making all its facilities available for the August period and for processing these proceedings for publication. In particular we would like to thank the Director, Professor Neil Trudinger for suggesting the conference and for facilitating the visits of our overseas participants. The Workshop/Miniconference attracted participants from Bulgaria, Canada, England, France, Greece, Israel and the United States of America as well as members from ten Australasian universities.

Especially we wish to thank Mrs Marilyn Gray the Secretary of the Centre, who so efficiently handled the administration of the Workshop/Miniconference from early in 1987 when visitor arrangements were being made, up to the end of 1988 when the proceedings were being put to press.

We also thank Mrs Jan Garnsey, secretary to the Department of Mathematics at the University of Newcastle for her assistance with correspondence and Mrs Dorothy Nash for her support during the August meeting.

And, of course, our thanks to our colleagues who made August 1988 in Canberra such a pleasant and productive time.

**SIMON FITZPATRICK**  
**JOHN GILES (Editors)**

## REPORT ON THE WORKSHOP/MINICONFERENCE

In 1987 I contacted Neil Trudinger as Director of the Centre for Mathematical Analysis to tell him that Vitali Milman intended visiting Australia. His response was that we should organize a workshop/miniconference for 1988.

In 1988 I was fortunate to obtain an ARGS Grant to study differentiability properties of distance functions and the grant money enabled a number of colleagues including Jonathan Borwein, Riki Brown, Simon Fitzpatrick, Gar de Barra and Petar Kenderov to visit Australia for some time both before and after the workshop/miniconference period in August.

So in 1988 this happy conjunction of support from the ARGS and CMA enabled ideal circumstances for mathematical research activity – a gathering of like-minded people to work on a common research area over a prolonged period of several months. When the participants gathered in Canberra for the preliminary workshop period several had already been in collaboration at the University of Newcastle and the workshop period brought that collaboration into sharper focus as we were joined by others with associated interests.

The Centre's policy of holding a workshop before the miniconference turned out to be a very fruitful feature of the August activity. Several problems raised in the workshop period were solved by the end of the miniconference and others are providing stimulus to further enquiry.

I was particularly pleased that we were able to gather a group of mathematicians who had common research interests, who are familiar with each others work but who had not previously met together in one place. The effect was an exhilaration and an explosion of effort which will bear fruit for a long time to come. For me there was great satisfaction that this meeting could be held in Australia and in the ideal setting where the Centre for Mathematical Analysis operates.

It should be mentioned that not all the papers which resulted from the collaboration culminating in the workshop/miniconference in August, are published in Volume 20 of the *Proceedings of the Centre for Mathematical Analysis*; a number of significant papers will be published elsewhere. Jonathan Borwein and Simon Fitzpatrick worked in collaboration at the University of Newcastle before the workshop/miniconference and three of their papers will be published in journals appropriate to their problem areas.

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I congratulate the Director of the Centre for Mathematical Analysis and his staff, particularly the Secretary, Mrs Marilyn Gray, for the efficient way the workshop/miniconference events are organised, especially in the minimizing of formality and the maximizing of collaborative informality. The Centre's style of operation makes an organizer's task particularly easy and helps the participants feel comfortable immediately.

I wholeheartedly commend to the Australian mathematical community the workshop/miniconference opportunities provided by the Centre for Mathematical Analysis. Mathematicians have always had more difficulty than others in attracting research funding from research grant bodies and we are at present facing the prospect of further reduction in support for our research efforts. Australian mathematicians in the future will be looking more than ever to the Centre for Mathematical Analysis for support with mathematical research in this country.

**JOHN GILES**

(workshop/miniconference organizer)