



# FIELDS INSTITUTE COMMUNICATIONS

THE FIELDS INSTITUTE FOR RESEARCH IN MATHEMATICAL SCIENCES

## Topics in Mathematical Economics and Game Theory

Essays in Honor of  
Robert J. Aumann

Myrna H. Wooders  
Editor



**American Mathematical Society**

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Providence, Rhode Island

## The Fields Institute for Research in Mathematical Sciences

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## Preface

Since the publication of the *Theory of Games* by John von Neumann and Oskar Morgenstern, game theory has played a continually increasing role in economics. It has also been of growing importance in other sciences, including biology, political science and psychology. Several scientists made early seminal contributions and have continued to be leaders in the field. We have in mind especially John Harsanyi, Lloyd Shapley, Martin Shubik, Robert Aumann, and Reinhard Selten (listed in order of age). In addition to his contributions to game theory and economics, Robert Aumann also made a number of significant contributions to mathematics, including his thesis,

“Asphericity of Alternating Knots”, *Annals of Mathematics* 64 (1956), pp. 374-392 and also:

“Integrals of Set-Valued Functions”, *Journal of Mathematical Analysis and Applications* 12 (1965), pp. 1-12.

“Measurable Utility and the Measurable Choice Theorem”, in *La Decision*, Editions du Centre National de la Recherche Scientifique, 1969, pp. 15-26, containing Aumann’s measurable selection theorem,

“A Variational Problem Arising in Economics”, *Journal of Mathematical Analysis and Applications* 11 (1965), pp.488-503 (with Micha Perles), and

“Orderable Set Functions and Continuity III: Orderability and Absolute Continuity”, *SIAM Journal on Control and Optimization* 15 (1977), pp. 156-162 (with Uri Rothblum).

Finally, no listing, however partial, of Aumann’s contributions to mathematics can omit

“Values of Non-Atomic Games”, Princeton University Press, 1974, xi + 333 pp. (with Lloyd S. Shapley),

which has led to large numbers of articles (one appearing in this volume).

Aumann’s publications in game theory began with

“Acceptable Points in General Cooperative  $n$ -Person Games”, in *Contributions to the Theory of Games IV*, *Annals of Math. Study* 40, Princeton University Press, 1959, pp. 287-324.

In this insightful and thought-provoking work Aumann introduced the important concept of “acceptable points” for a game. In a letter to the editor of this volume, responding to a request to reprint this paper, Bob Aumann wrote:

“There’s a soft spot in my heart for it: It is my first published paper in game theory proper. At the time it was published, I didn’t realize that the set of “acceptable points” is simply the beta-core. This realization – or better, reformulation – is intimately related to the development of the NTU theory, which came a year or two later.”

There are soft spots in the hearts of many game theorists for Bob Aumann, so we are especially pleased to reprint “Acceptable Points in General Cooperative  $n$ -Person Games” in this volume.



For a complete list of Aumann's publications through 1995, see *Game and Economic Theory: Selected Contributions in Honor of Robert J. Aumann*, Sergiu Hart and Abraham Neyman, Editors, University of Michigan Press, June 1995.

A number of the papers in the current volume, or related works, were presented at the Fields Institute Conference "New Directions in the Theory of Markets and Games", organized by Kenneth Arrow, Sergiu Hart, Andreu Mas-Colell, Jean-Francois Mertens, Walter Trockel, and Myrna Wooders (Chair), held in honor of Robert Aumann in 1995. The program of the conference concludes the volume.

In view of Aumann's contributions to mathematics and also the social sciences, it is most appropriate that this Fields Institute Communication volume be in his honor. It is with great pleasure that the contributors and the editor dedicate this volume to Bob Aumann.

Myrna H. Wooders  
Editor

October 1998

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## Appendix

### Presentations

at

The Fields Institute Workshop

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October 19 – 23, 1995

Toronto, Ontario, Canada

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