Theory of games and economic behavior

The nature of the problems investigated and the techniques employed in this book necessitate a procedure which in many instances is thoroughly mathematical. The mathematical devices used are elementary in the sense that no advanced algebra, or calculus, etc., occurs. (With two, rather unimportant, exceptions: Part of the discussion of an example in 19.7. et seq. and a remark in A.3.3. make use of some simple integrals.) Concepts originating in set theory, linear geometry and group theory play an important role, but they are invariably taken from the early chapters of those disciplines and are moreover analyzed and explained in special expository sections.

Nevertheless the book is not truly elementary because the mathematical deductions are frequently intricate and the logical possibilities are extensively exploited. Thus no specific knowledge of any particular body of advanced mathematics is required. However, the reader who wants to acquaint himself more thoroughly with the subject expounded here, will have to familiarize himself with the mathematical way of reasoning definitely beyond its routine, primitive phases. The character of the procedures will be mostly that of mathematical logics, set theory and functional analysis. We have attempted to present the subject in such a form that a reader who is moderately versed in mathematics can acquire the necessary practice in the course of this study. We hope that we have not entirely failed in this endeavour. In accordance with this, the presentation is not what it would be in a strictly mathematical treatise. All definitions and deductions are considerably broader than they would be there. Besides, purely verbal discussions and analyses take up a considerable amount of space. We have in particular tried to give, whenever possible, a parallel verbal exposition for every major mathematical deduction. It is hoped that this procedure will elucidate in unmathematical language what the mathematical technique signifies—and will also show where it achieves more than can be done without it. ! In this, as well as in our methodological stand, we are trying to follow the best examples of theoretical physics. The reader who is not specifically interested in mathematics should at first omit those sections of the book which in his judgment are too mathematical. We prefer not to give a definite list of them, since this judgment must necessarily be subjective. However, those sections marked with an asterisk in the table of contents are most likely to occur to the average reader in this connection. At any rate he will find that these omissions will little interfere with the comprehension of the early parts, although the logical chain may in the rigorous sense have suffered an interruption. As he proceeds the omissions will gradually assume a more serious character and the lacunae in the deduction will become more and more significant. The reader is then advised to start again from the beginning since the greater familiarity acquired is likely to facilitate a better understanding.

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1. Prospective
What began more than sixty years ago as a modest proposal that a mathematician and an economist write a short paper together blossomed, in 1944, when Princeton University Press published Theory of Games and Economic Behavior. In it, John von Neumann and Oskar Morgenstern conceived a groundbreaking mathematical theory of economic and social organization, based on a theory of games of strategy. Not only would this revolutionize economics, but the entirely new field of scientific inquiry it yielded--game theory--has since been widely used to analyze a host of real-world phenomena from arms races...