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Passion for Trilli. Some ideas in mathematics. (Passione per Trilli. Alcune idee dalla matematica.)

Berlin: Springer (ISBN 978-88-470-0628-7/pbk). xiv, 154 p. (2007).

Many attempts have been made to explain mathematics to non-mathematicians, for example, during the "Year of Mathematics" in Germany in 2008. In principle, such attempts must fail: either one tries to give some substantial insight which is of course too much for laymen, or one tries to keep understandable, then one necessarily remains on a completely trivial level. This book constitutes another such attempt. The author tries to share his insight in some interesting fields of modern mathematics with potential readers, with a particular emphasis on two topics: first, the concept of infinity; second, some ideas of game theory and equilibrium theory related to the names of Gödel, Nash, and von Neumann. In the first part the author briefly discusses the concept of infinity, or rather infinities, proving that the set of rational numbers is countable, while the set of real numbers is uncountable. He also introduces the idea of limit in calculus, touching even so sophisticated points like rearrangements of converging alternating series which are not absolutely convergent. The second and third part are concerned with some notions, methods and results from the theory of games and recursions, such as decision trees, Nash equilibrium, minimax theorems, utility functions, and preferences. In the fourth part the author discusses algebraic structures like groups and fields, including several illuminating examples involving complex numbers and matrices. Afterwards he takes a closer look at the biographies and contributions of the above mentioned three giants of mathematics of the 20th century, Kurt Gödel, John F. Nash, and Johann von Neumann. Finally, in the sixth part he describes some application of mathematical methods to social sciences, e.g., Arrow's impossibility theorem. Unfortunately, a subject index at the end is missing; it would be helpful to include it in a subsequent edition, if there is any. Of course, also this book has its merits. The author tries hard to explain the underlying mathematics with utmost care, and his quite talkative style makes the reading smooth and entertaining. But this refers, of course, only to people who already have a sound background in mathematics, widely exceeding what is usually taught at school. So the pessimistic statement in the first paragraph applies as well to this book.

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