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An introduction to the theory of functional equations and inequalities. Cauchy's equation and Jensen's inequality. (English) [Zbl 0555.39004](#)

Prace Naukowe Uniwersytetu Śląskiego w Katowicach, 489. Uniwersytet Śląski. Warszawa-Kraków-Katowice: Państwowe Wydawnictwo Naukowe. 523 p. zł 460.00 (1985).

This book is a real holiday for all the mathematicians independently of their strict speciality. One can imagine what deliciousness represents this book for "functional equationists". The conception of the book is explained in the introduction: "It may be objected whether an exposition devoted entirely to a single equation (Cauchy's functional equation) and a single inequality (Jensen's inequality) deserves the name 'An introduction to the theory of functional equations and inequalities'. However, the Cauchy equation plays such a prominent role in the theory of functional equations that the title seemed appropriate. Every adept of the theory of functional equations should be acquainted with the theory of the Cauchy equation and a systematic exposition of the latter is still lacking in the mathematical literature, the results being scattered over particular papers and books. We hope that the present book will fill this gap. The properties of convex functions (i.e. functions fulfilling the Jensen inequality) resemble so closely those of additive functions (i.e. functions satisfying the Cauchy equation) that it seemed quite appropriate to speak about the two classes of functions together."

The book consists of three parts: I. Preliminaries (Set theory, Topology, Measure theory, Algebra); II. Cauchy's functional equation and Jensen's inequality (Additive functions and convex functions, Elementary properties of convex functions, Continuous convex functions, Inequalities, Boundedness and continuity of convex functions and additive functions, The classes \mathcal{A} , \mathcal{B} , \mathcal{C} , Properties of Hamel bases, Further properties of additive functions and convex functions); III. Related topics (Related equations, Derivations and automorphisms, Convex functions of higher orders, Subadditive functions, Nearly additive functions and nearly convex functions, Extensions of homomorphisms).

From the introduction we learn of the origin of this book: "The present book is based on the course given by the author at the Silesian University in the academic year 1974/75, entitled: Additive functions and convex functions. In writing it, we have used the excellent notes taken by K. Baron."

Reviewer: [B.Crstici](#)

MSC:

- [39B99](#) Functional equations and inequalities
- [39B72](#) Systems of functional equations and inequalities
- [39-02](#) Research exposition (monographs, survey articles) pertaining to difference and functional equations
- [26A51](#) Convexity of real functions in one variable, generalizations

Cited in **21** Reviews
Cited in **202** Documents

Keywords:

[Cauchy's equation](#); [Jensen's inequality](#); [Additive functions](#); [convex functions](#); [Hamel bases](#); [Derivations](#); [automorphisms](#); [Subadditive functions](#)