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Classical descriptive set theory. (English) Zbl 0819.04002

Graduate Texts in Mathematics. 156. Berlin: Springer-Verlag. xx, 402 p. (1995).

The aim of this monograph is to give an introduction to classical descriptive set theory and ideas of connections with other areas of mathematics.

The core of the theory is contained in separate chapters on Borel, analytic, co-analytic and projective sets. Besides the recent knowledge of the classical theory on separation of sets, projections, uniformizations, selections etc., detailed study is devoted also to infinite games and their connections with definability of sets. The theory of ranks and scales is the central point in some parts of the theory of co-analytic and analytic sets. The periodicity theorems concerning properties of the higher projective classes form the main content of the last chapter.

There are many applications, and some closely connected topics are investigated, too. Let us point out, e.g., the very interesting part on connections with set theory including the forcing method, Ramsey type theory for sets with the Baire property and its application to the proof of Rosenthal's theorem on Banach spaces containing l_1 . Extra paragraphs are devoted to measure theory and many results on hyperspaces of sets and σ -ideals of sets can be found.

The book contains in some directions much more than a pure introduction to the classical theory. Many classical results appear in a generality known only quite recently. There are many results and/or proofs due to the author.

The organization of the book is very clear and it can be easily used not only as an introductory text but also as a reference book for finding known results on topics the reader is interested in and for finding interesting applications. The proofs are often very brief and they presume some experience. There are about 400 exercises giving often more information about further known results with hints to prove them. The introductory chapter is devoted to Polish spaces and three appendices give some set-theoretical background needed throughout the book.

Reviewer: [P.Holicky \(Praha\)](#)

MSC:

- [03E15](#) Descriptive set theory
- [03-01](#) Introductory exposition (textbooks, tutorial papers, etc.) pertaining to mathematical logic and foundations
- [28A05](#) Classes of sets (Borel fields, σ -rings, etc.), measurable sets, Suslin sets, analytic sets
- [03-02](#) Research exposition (monographs, survey articles) pertaining to mathematical logic and foundations
- [91A44](#) Games involving topology, set theory, or logic
- [54H05](#) Descriptive set theory (topological aspects of Borel, analytic, projective, etc. sets)

Cited in **14** Reviews
Cited in **1065** Documents

Keywords:

[Borel sets](#); [analytic sets](#); [coanalytic sets](#); [Ramsey theory](#); [projective sets](#); [separation](#); [projections](#); [uniformizations](#); [selections](#); [infinite games](#); [definability](#); [ranks](#); [scales](#); [periodicity](#); [higher projective classes](#); [forcing](#); [Baire property](#); [hyperspaces](#); [\$\sigma\$ -ideals](#); [Polish spaces](#)