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ALGEBRA IN THE STONE–ČECH COMPACTIFICATION: AN UPDATE

NEIL HINDMAN AND DONA STRAUSS

Abstract. The first edition of *Algebra in the Stone–Čech Compactification* was published in 1998 and the second edition in 2012. Since that time there have been many new results published about the algebraic structure of the Stone–Čech compactification βS of the discrete semigroup S and the combinatorial applications of that structure, mostly in the area of Ramsey theory. We present here, with proofs so far as possible, what we believe to be some of the most significant of these new results.

Part 1. Introduction

There has been a substantial amount of research on the algebraic structure of the Stone–Čech compactification of a discrete semigroup or its combinatorial applications since the publication of [71]. In this paper, we present a few of what we feel are the most significant and striking of these results.

We shall assume that the reader is familiar with the basic structure of βS as presented in [71, Part I]. We will provide detailed proofs of the results we present. The only result that we use and do not prove is the density Hales–Jewett theorem, Theorem 2.1.

In Part 2 of this paper, we present some new Ramsey theoretic applications.

Early in the applications of the algebraic structure of βS to Ramsey theory came some results about the combined additive and multiplicative

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