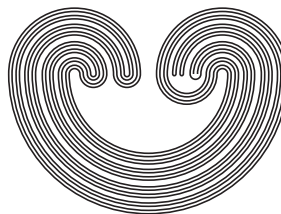


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CENTRAL SETS THEOREM FOR ARBITRARY ADEQUATE PARTIAL SEMIGROUPS

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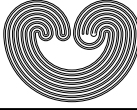
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CENTRAL SETS THEOREM FOR ARBITRARY ADEQUATE PARTIAL SEMIGROUPS

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ABSTRACT. We establish a Central Sets Theorem valid for arbitrary adequate partial semigroups. Except for the requirement that the sequences considered be *adequate*, it is identical to the currently most general version of the Central Sets Theorem for semigroups. We present an application to the partial semigroup of located words and obtain several related results.

1. INTRODUCTION

Since their introduction in 1981 in [3], central sets in semigroups have been shown to have significant combinatorial properties. And since, whenever a semigroup is partitioned into finitely many sets, one of those sets must be central, there are important consequences for Ramsey theory. For example, it is shown in [3] that if C is a central subset of \mathbb{N} , then C contains solutions to every partition regular system of homogeneous linear equations. See the survey [6] for many more examples of properties enjoyed by any central set. And see section 2 of this paper for definitions of this or any other unfamiliar notions discussed in this introduction.

Most of the desirable properties enjoyed by central sets are consequences of the Central Sets Theorem. The original version established in [3] is the following. (Given a set X , we write $\mathcal{P}_f(X)$ for the set of finite nonempty subsets of X .)

Theorem 1.1. *Let F be a finite set of sequences in \mathbb{Z} and let C be central in \mathbb{N} . There exist a sequence $\langle a_n \rangle_{n=1}^\infty$ in \mathbb{N} and a sequence $\langle H_n \rangle_{n=1}^\infty$ in $\mathcal{P}_f(\mathbb{N})$ such that*

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