

# Contents

<b>1</b>	<b>Introduction</b>	1
1.1	Convex Geometry	1
1.2	Krull Domains, Transfer Krull Monoids and Factorization	4
1.3	Zero-Sum Sequences	7
1.4	Overview of Main Results	8
<b>2</b>	<b>Preliminaries and General Notation</b>	13
2.1	Convex Geometry	13
2.2	Lattices and Partially Ordered Sets	16
2.3	Sequences and Rational Sequences	18
2.4	Arithmetic Invariants for Transfer Krull Monoids	21
2.5	Asymptotic Notation	24
<b>3</b>	<b>Asymptotically Filtered Sequences, Encasement and Boundedness</b>	25
3.1	Asymptotically Filtered Sequences	25
3.2	Encasement and Boundedness	30
<b>4</b>	<b>Elementary Atoms, Positive Bases and Reay Systems</b>	37
4.1	Basic Non-degeneracy Characterizations	37
4.2	Elementary Atoms and Positive Bases	39
4.3	Reay Systems	43
4.4	$\mathcal{F}$ -Filtered Sequences, Minimal Encasement and Reay Systems	52
<b>5</b>	<b>Oriented Reay Systems</b>	59
<b>6</b>	<b>Virtual Reay Systems</b>	97
<b>7</b>	<b>Finitary Sets</b>	133
7.1	Core Definitions and Properties	133
7.2	Series Decompositions and Virtualizations	161
7.3	Finiteness Properties of Finitary Sets	172
7.4	Interchangeability and the Structure of $X(G_0)$	199

<b>8 Factorization Theory .....</b>	207
8.1 Lambert Subsets and Elasticity .....	207
8.2 The Structure of Atoms and Arithmetic Invariants .....	236
8.3 Transfer Krull Monoids Over Subsets of Finitely Generated Abelian Groups .....	253
<b>References.....</b>	271
<b>Index.....</b>	277