

Contents

| | |
|---|-----|
| <i>Preface</i> | vii |
| 1. λ -Rings | 1 |
| 1.1 Symmetric Functions | 1 |
| 1.2 λ -Rings | 5 |
| 1.3 Free λ -Rings | 14 |
| 1.4 The Verification Principle | 17 |
| 1.5 The Splitting Principle | 18 |
| 1.6 Exercises | 21 |
| 2. Universal λ -Rings | 23 |
| 2.1 The Universal λ -Ring $\Lambda(R)$ | 23 |
| 2.2 Categories and Functors | 31 |
| 2.3 Comonads and Coalgebras | 35 |
| 2.4 λ -Rings as Λ -Coalgebras | 39 |
| 2.5 Exercises | 42 |
| 3. Adams Operations | 43 |
| 3.1 Adams Operations | 44 |
| 3.2 γ -Operations | 52 |
| 3.3 γ -Filtration | 57 |
| 3.4 ψ -Rings | 65 |
| 3.5 ψ -Rings as Ψ -Coalgebras | 69 |
| 3.6 Wilkerson's Theorem | 72 |
| 3.7 Localization and Completion of λ -Rings | 75 |
| 3.8 Exercises | 78 |
| 4. Witt Vectors | 81 |
| 4.1 Big Witt Vectors | 82 |
| 4.2 Artin-Hasse Exponential | 90 |

| | | |
|-----|--|-----|
| 4.3 | Characterization of the Functor Λ | 94 |
| 4.4 | \mathbf{W} as a Comonad | 97 |
| 4.5 | Exercises | 106 |
| 5. | Binomial Rings | 109 |
| 5.1 | Binomial Rings as λ -Rings | 110 |
| 5.2 | Integer-Valued Polynomials | 116 |
| 5.3 | A Basis for Integer-Valued Polynomials | 119 |
| 5.4 | Binomial Rings as Integer-Valued Polynomials | 124 |
| 5.5 | Knutson's Theorem | 126 |
| 5.6 | Necklace Rings | 128 |
| 5.7 | Exercises | 134 |
| 6. | Filtered λ -Rings, I | 135 |
| 6.1 | Filtered λ -Rings | 136 |
| 6.2 | Power Series Rings | 140 |
| 6.3 | Classification of $\lambda(\mathbf{Z}[x]/\langle x^2 \rangle)$ | 142 |
| 6.4 | Classification of $\lambda(\mathbf{Z}[x]/\langle x^3 \rangle)$ | 146 |
| 6.5 | Exercises | 158 |
| 7. | Filtered λ -Rings, II | 159 |
| 7.1 | Power Series Rings | 160 |
| 7.2 | Filtered λ -Rings as Coalgebras | 165 |
| 7.3 | Exercises | 167 |
| 8. | Open Problems | 169 |
| 8.1 | Power Series and Polynomial Rings | 169 |
| 8.2 | Universal Ring Γ | 170 |
| 8.3 | Representation Ring | 171 |
| 8.4 | Topological K -Theory | 172 |
| 8.5 | Mislin Genus | 173 |
| | <i>Hints to Selected Exercises</i> | 175 |
| | <i>List of Notations</i> | 179 |
| | <i>Bibliography</i> | 183 |
| | <i>Index</i> | 187 |