Contents

Introduction	1
Chapter 1. The Definition and Some Basic Properties of the Algebra $H[\pi]$	15
Chapter 2. A Decomposition of the Algebra $H[\pi]$ when $\frac{1}{2} \in k$	21
Chapter 3. Structure of the Algebra $H[\pi]$ for Two-Generator Groups	29
Chapter 4. Absolutely Irreducible $SL(2)$ Representations of Two-Generator Groups	r 39
Chapter 5. Further Identities in the Algebra $H[\pi]$ when $\frac{1}{2} \in k$	47
Chapter 6. Structure of $H^+[\pi_n]$ for Free Groups π_n	59
Chapter 7. Quaternion Algebra Localizations of $H[\pi]$ and Absolutely Irreduci $SL(2)$ Representations	ble 69
Chapter 8. Algebro-Geometric Interpretation of $SL(2)$ Representations of Groups	83
Chapter 9. The Universal Matrix Representation of the Algebra $H[\pi]$	89
Chapter 10. Some Knot Invariants Derived from the Algebra $H[\pi]$	101
Appendix A. Addenda 1*. Addendum to Chapter 1 2*. Addendum to Chapter 2 3*. Addendum to Chapter 3 4*. Addendum to Chapter 4 5*. Addendum to Chapter 5 6*. Addendum to Chapter 6 7*. Addendum to Chapter 7 8*. Addendum to Chapter 8 9*. Addendum to Chapter 9	107 107 110 113 116 130 140 146 162
Appendix B. Afterword	183
Bibliography	195