Future Research Directions Higher-Degree Applications & Extensions **Algebraic Extensions** • Extensions to quartic & higher fields Cryptographic primitives based on HAPD Algebraic number detection tools Projective space in dimension n+1Hermite Invariant theory for higher degrees • Number-theoretic algorithm improvements Problen • Galois theory connections • Symbolic computation systems **S**olution **Computational** Geometric **Foundations Algorithms** Mathematical Physics Optimized HAPD implementation Projective geometry generalizations Vectorized computation techniques Multi-dimensional continued fractions **Connections** • Parallel detection algorithms • Homogeneous space dynamics • Complexity That while abending sking key research directions emerging from our solution Diopleanting sapproximation theory Each branch represents a distinct path for extending that be continued foundations and practical applications of periodicity detection in cubic irrationals and related algebraic structures. Statistical mechanics analogies Entropy & ergodic theory connections