

# About This Project

## About the Mathematics Knowledge Graph Wiki

### Vision

This project aims to create a comprehensive, queryable knowledge graph that represents mathematical knowledge as interconnected concepts. By combining human-readable documentation with machine-readable semantic data, we enable both learning and automated reasoning about mathematics.

### Technical Architecture

#### Content Layer (Quarto)

- Human-readable mathematical content
- LaTeX equation support
- Cross-referencing system
- Structured metadata in YAML

#### Semantic Layer (RDF/OWL)

- Formal ontology defining mathematical concepts
- RDF triples representing relationships
- SPARQL endpoint for querying
- Linked Data publication

#### Verification Layer (Lean 4)

- Formal mathematical proofs
- Dependency tracking
- Integration with mathlib4
- Verification of logical consistency

#### Visualization Layer

- Interactive graph visualizations
- Dependency diagrams
- Concept maps
- Learning path visualization

### Ontology Structure

Our knowledge graph uses the following core node types:

- **Axiom:** Fundamental assumptions taken as true
- **Definition:** Formal definitions of mathematical concepts

- **Theorem:** Proven mathematical statements (including lemmas, propositions, corollaries)
- **Example:** Concrete instances illustrating concepts

And the following relationships:

- **uses/dependsOn:** Logical dependencies between concepts
- **hasExample:** Links concepts to their examples
- **generalizes/specializes:** Hierarchical relationships
- **implies:** Logical implications

## Development Status

This project is under active development. See our [GitHub repository](#) for the latest updates.

## Contact

For questions or contributions, please open an issue on our GitHub repository.