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.