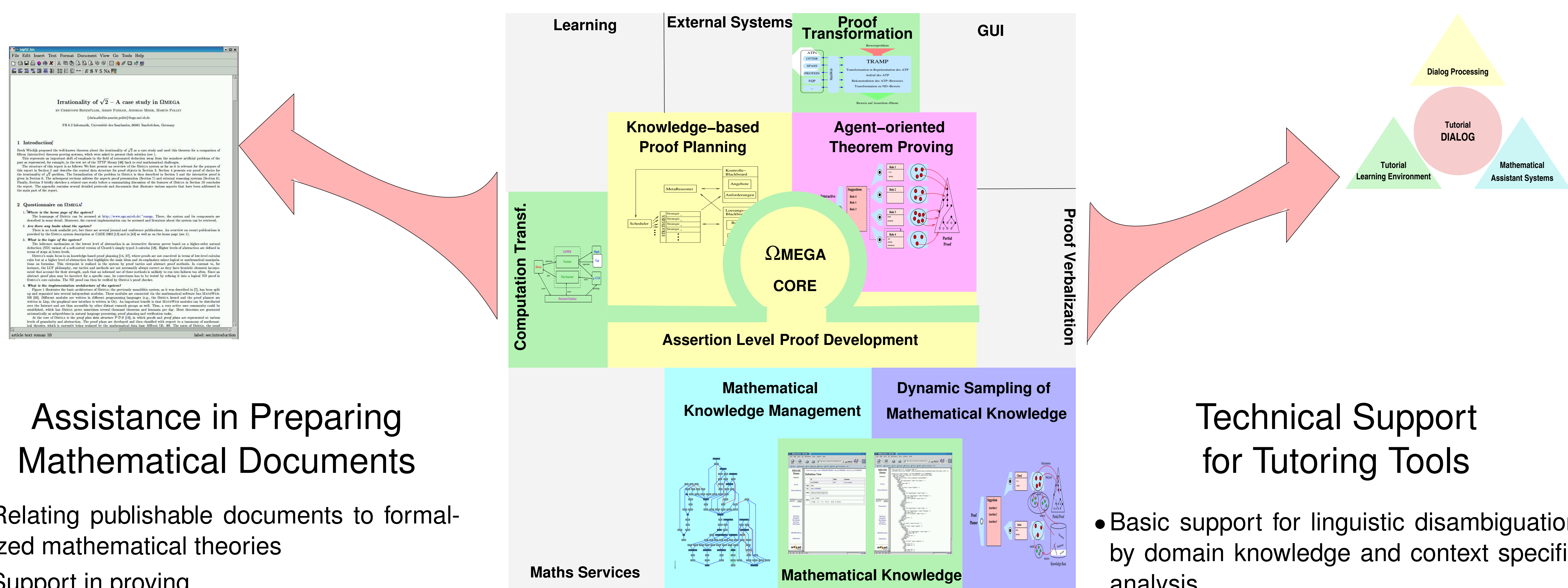


Computer Supported Mathematics



Assistance in Preparing Mathematical Documents

- Relating publishable documents to formalized mathematical theories
- Support in proving
- Partially certified mathematical documents by proof checking

Technical Support for Tutoring Tools

- Basic support for linguistic disambiguation by domain knowledge and context specific analysis
- Basic support for proof step evaluation

Assertion-Level Proof Development

Common Infrastructure for Reactive and Deliberative Proof Planning

- **Sharing mathematical knowledge resources**
- Common data-structure for abstract inference steps
- Common data-structure for abstract level proof construction
⇒ Interleaving of reactive and deliberative proof planning

Assertion-Level Proof Planning Strategies

- Critical migration of proof-planning knowledge
- Many proof-planning methods **subsumed** by CORE
- A **more abstract representation language** for proof-planning
- Proof planning knowledge required to technically support mathematical paper writing and tutoring tools (MI3 DIALOG, TB1 Math. Tutor)

Transformation of External Proofs and Computations

Two lines of research

- **Mimic** external proofs and computations via proof plans
- **Translate** external resolution and paramodulation proofs into CORE derivations

Mathematical Knowledge

Maintenance & Management

- Types of **mathematical knowledge resources**
 - Mathematical domains formalized in structured theories
 - Domain/theory/problem-specific tactics, Ω -ANTS-agents, proof-planning methods, control rules and strategies
 - Mathematical documents/articles with formal content
- **Maintenance** for **all** mathematical knowledge sources and efficient **management of change** (based on the MAYA system)

Dynamic Sampling of Mathematical Knowledge

- For preparing mathematical publications
- During automated student tutoring
- To assist automatic proof-planning