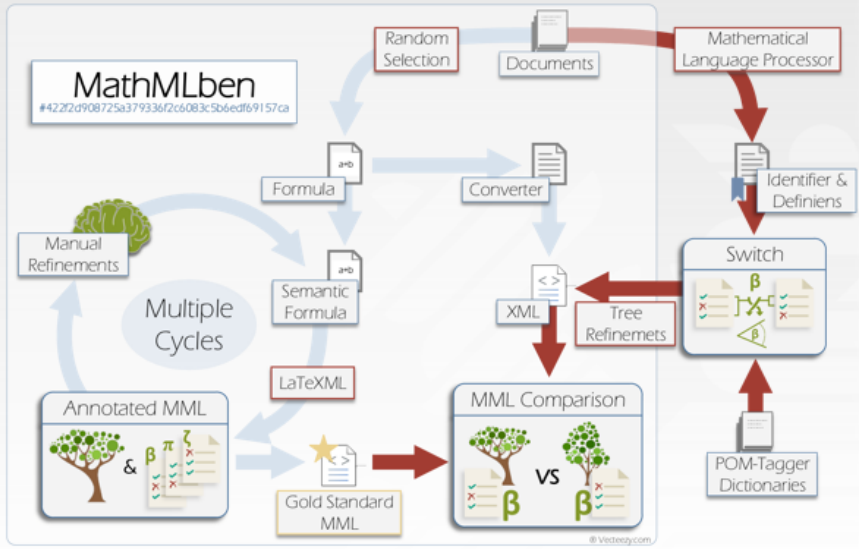
Improving LaTeX to MathML Translation Tools

Background

In STEM, mathematical formulae are crucial for communicating information. Enabling computers to access the information encoded in mathematical formulae requires machine-readable formats, e.g., MathML, that can represent both the presentation and content. However, existing conversion tools have difficulties to convert LaTeX, the de-facto standard for typesetting math, to the machine readable format MathML. We are want to improve the conversion tools by considering the textual context.



Goal

Devise an approach to combine the results from extracted descriptors and a knowledge database to improve translation tools by manipulating MathML data.

Tasks

- Review state-of-the-art architectures for Mathematical Information Retrieval tasks.
- Evaluate the benefits of considering the textual context using our MathMLBen pipeline.

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Automatic Translations between LaTeX and CAS

Background

Modern mathematicians and scientists in math-related disciplines often use LaTeX to typeset mathematical expressions and Computer Algebra Systems (CAS), e.g. Mathematica or Maple, to calculate them. Usually, researchersanually translate the expressions between LaTeX and CAS. This process is time-consuming and error-prone.

Rendered Version:

$$P_n^{(\alpha,\beta)}(\cos(a\Theta))$$

Generic LaTeX:

```
P_n^{(\alpha,\beta)}(\cos(a\Theta))
```

Semantic LaTeX:

```
\JacobiP{\alpha}{\beta}{n}@{\cos@{a\Theta}}
```

CAS **Maple**:

```
JacobiP(n,alpha,beta,cos(a*Theta))
```

CAS **Mathematica**:

```
JacobiP[n,\[Alpha],\[Beta],Cos[a \[CapitalTheta]]]
```

Goal

Design and develop a system for translations from Mathematica to semantic LaTeX, i.e., LaTeX that carries most of the semantic information.

Tasks

- Review the pros and cons of the existing export functionality of Mathematica.
- Develop and evaluate a new translation from Mathematica to semantic LaTeX.

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