On semiformal natural language theorems and proofs

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Abstract. My lecture reports on progress in our FMathL project
`https://www.mat.univie.ac.at/~neum/FMathL.html`

for working automatically with mathematics written in a natural langugage and represented in the CONCISE system for semantic modeling.

Mathematical discourse is representable in abstract form in terms of a context logic, and in terms of semantic data structures as a record in CONCISE, typed with our adaptation VMathL of the MathNat grammar by Muhammad Humayoun. This record can be created automatically from a text in a specified controlled natural language (English with highly restricted grammar).

The interpretation of ordinary mathematical text written in Latex is more difficult, but we made partial progress. We collected a large multilanguage library of mathematical terms. We recognize at present a well-defined small set of typical phrases, handling English, German, and French declination of terms and conjugation of verbs reasonably correct way. The internal formal semantic structure created does not yet match that of VMathL but still lacks a dedicated formal rearrangement step from a language-oriented structure to the content-oriented structure of VMathL.

We are presently experimenting with a semiautomatic way of checking small, detailed proofs represented in VMathL using the theorem prover Vampire.