Report on the WG2-GEO25 meeting

EuroProofNet WG2-GEO25 meeting (Kraków, Poland, June 3-5, 2025) was aimed at setting common grounds for the Automated Deduction in Geometry network of researchers, in terms of provers, axioms, conjectures, and overall organization. The main goal was the specification of the ADG-Lib, an initiative for setting a common signature for axioms and conjectures in computer aided theorem proving in geometry.

ADG-Lib

Over the last 70 years, many resources related to automated reasoning in geometry have been developed: axiom systems, sets of conjectures, and tools. But almost each of them has its own language in which statements are expressed, which prevents the sharing of resources. Because of that, the need for a common library of axiomatic systems and theorems for geometric automated theorem provers has been felt for many years now. Instead of specifying yet another format for geometry statements, we decided to define a signature on top of the (widely used) (FOF format) of Thousands of Problems for Theorem Provers problem library (TPTP), and then to build converters from/to the library and a range of automated provers and libraries for proof assistants. We call this library and the related tools ADG-Lib, following the name of the central conference in the field: Automated Deduction in Geometry (ADG).
Encouraged by the success of the SMT-Lib initiative (https://smt-lib.org), founded more than 20 years ago and which significantly advanced the field of SMT (Satisfiability Modulo Theory), we set similar goals for the ADG-Lib initiative:

- Provide rigorous descriptions of the axiom systems used by the different geometry automatic theorem provers;
- Develop and prompt common input and output languages for geometry automatic theorem provers;
- Establish and make available to the research community a large library of benchmarks for geometric automatic theorem provers.

ADG-Lib Signatures

During the EuroProofNet WG2-GEO25 meeting, we discussed the preliminary ADG-Lib signature and resolved a number of open issues:

- underlying theories -- the first one is solid Euclidean geometry, with one sort -- for points;
- naming conventions -- Camel notation;
- sets of predicate symbols, function symbols, and sets of non-deterministic function symbols (such as “onRay”)
- NDG (non-degenerate cases) and DG (allowing degenerate cases) versions of predicate symbols;
- other issues: order of arguments, names of arguments, redundancies, etc.

The plan is to port the GeoCoq library of formal geometry proofs to ADG-Lib, when done, this will be version 1.0 of ADG-Lib.

ADG-Lib Converters

During the EuroProofNet WG2-GEO25 meeting, following earlier, available C and Prolog parsers for conjectures stored in GCLC, JGEx, and GeoGebra formats, we have developed a completely new, more robust general converter toolkit ADG-Lib-toolkit. During the meeting, the following components were developed:

- parsers for GCLC and JGEx formats,
- data-structures for internal representation following ADG-Lib,
- output for GCLC, GeoGebra, TPTP formats.

The plan is to implement also:

- parsers for GeoGebra and TPTP formats, and output for JGEx;
- a tool for conversion from declarative conjecture representation into a procedural counterpart;
- a tool for checking if the conjectures stored in ADG-Lib form are substantially the same.

ADG-Lib axioms sets and conjectures

During the EuroProofNet WG2-GEO25 meeting, using the ADG-Lib-toolkit, we started to build a set of geometry conjectures by converting available GCLC conjectures. However, we also started to encode (in the TPTP version of ADG-Lib) available axiom systems and accompanying conjectures, for now -- by Gelertner and by Flenner.

ADG Foundation

We discussed questions related to ADG Foundation's (ADG-F) workflow and technical background. If a question arises for the Steering Committee (SC), it should be asked on the mailing list, and a possible suggestion for the answer should be given. By default, we assume that the suggestion will be accepted by the SC. If not, a member of the SC should reply with another suggestion. If such another suggestion is not given within a reasonable number of days (for example, in 2 weeks), the original suggestion should be considered to be accepted.
We agreed on storing ADG-F's website in a GitHub repository called "website". We generate the content of adg-foundation.info from that repository automatically and redirect the page, registered at porkbun.com (by using Zoltán Kovács's login), to http://adg-foundation.github.io/website/. This machinery already works (it has been implemented during the meeting). In case someone wants to edit ADG-F's website, either ask for direct write access or fork the repository https://github.com/ADG-Foundation/website and propose changes via a pull request.
We welcomed two new members (Adam Trybus and Anna Petiurenko) to ADG-F.

ADG Conferences

We received a couple of suggestions on how to continue the series of ADG conferences. Julien Narboux sent an idea prior to the meeting about a parallel conference with two venues (one in China, one in Europe) with an intersection of joint online programmes. Considering the strong background of the Chinese ADG school, we are looking forward to a closer collaboration between the two continents. Further discussion should be done in emails before the ADG 2025 meeting in Stuttgart and at the business meeting.
Also, we are looking forward to organizing the ADG Conference 2025. Julien and Pedro Quaresma received the reviewers' feedback, and the authors have been notified of acceptance/rejection during the last couple of days (16/17 submissions have been accepted for presentation). Unfortunately, the conference will be somewhat more expensive than the usual meetings, but hopefully we will still have attendees. (Pedro, Julien, Vesna, Zoltán, and a student of Zoltán's already plan to be present.) Update: See https://www.dhbw-stuttgart.de/cade-30/registration/ for more details.
Good news: The last special issue of AMAI is almost ready to go, what is missing is: "Foreword" (by Pedro and Zoltán). Here is the link to the collection: https://link.springer.com/collections/iifdahijce.

GitHub page

The initial GitHub page of ADG foundation at https://github.com/ADG-Foundation?view_as=public should be reorganized to point to two main projects: ADG-Lib (as a repository) and ADG-Provers, by explaining their roles in ADG-F. In the ADG-Provers section we should point to stable versions of the supported provers that are under the umbrella of ADG-F (like GCLC and Java Geometry Expert). (Note: This has already been achieved right after the meeting.)
For the ADG-Lib repository, we should add a generic description and reorganize the folders.
Also, we should write a final report on the two goals of the ADG-Lib repository, by highlighting our efforts during the Kraków meeting: on the "0.9 version" of the "common language" being created, and a "0.9 version" of the converter between various formats (including the TPTP/FOF format as well). These two main goals should be separated into folders that reflect a clear structure.

Goals for the next meeting at ADG 2025

We would like to finalize ADG-Lib 1.0 and ADG-Converter 1.0, create and maintain the GitHub section “ADG-Provers”, add the ADG “List of problems” and the ADG “Axiom sets”.