Extension of a dynamic geometry software with new data types and operations

Davorka Radaković[1], Đorđe Herceg[1], and William Steingartner[2]

[1]Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad, Trg Dositeja Obradovića 4, 21000 Novi Sad, Serbia, davorkar@dmi.uns.ac.rs, herceg@dmi.uns.ac.rs
[2]Department of Computers and Informatics, Faculty of Electrical Engineering and Informatics, Technical University of Košice, Košice, Slovakia, william.steingartner@tuke.sk

Contemporary education supersedes the traditional one (teacher-to-student lessons) with technology-based learning. Dynamic Geometry Software (DGS) play a significant part in devising, creating and demonstrating visually plentiful interactive teaching and learning materials. Dynamic drawings created with DGS are usually specified as expressions written in functional domain-specific languages. As the acceptance of DGS increases, a need for their extensibility also arises, to cover all the fields of application to different teaching subjects and domains.

The extensibility of software for dynamic algebra and geometry is achieved by adding new semantics, represented by new data types and operations. Thereby, it is necessary to address a few potential problems such as compatibility with existing data types, extension of standard operations, property separation of new data types and visualization subsystem extension. Also, the implementation needs to be straightforward and modular. We present our approach to this topic, in a form of a extensibility framework supported with metadata, and provide several practical examples.

We have developed the SLGeometry DGS implemented in C# on the .NET Framework. It has a genericized functional language and the corresponding expression evaluator that act as a framework into which specific semantics is embedded with metadata.

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