

Method for Processing Graph Degeneracy in Dynamic Geometry Based on Domain Design

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Research Objectives

- This research belongs to geometric constraint solving and dynamic geometry system(DGS).
- Inspired from the famous DGSs, such as Geometry Expert, GeoGebra and Supper Sketchpad.

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- The main purpose is to solve the problem that when there are critical points in the DGS, the continuous path from the start instance to the end instance can still be calculated.
- To solve the problem of failing in completely presenting a geometric graph under some degeneracy situations, which is an important problem in the design of DGS.

Research Method

- Inspired from the definition of circle in modern Euclidean geometry system.
- Given an domain model design to describe an abstract geometry *Element*, *Constrain* and *ConstrainObject*.
- Produced a new algorithm for updating elements in DGS.

Research Results

- The method is suitable for all degeneracy situations where the output type of the geometric element changes in 2D and 3D DGS.
- The method has been implemented in a on-line DGS named NetPad.

Research Conclusions

- By further studying the relevant knowledge to the domain model design process, the original data structure of the dynamic geometry system is improved, and the corresponding update algorithm is designed.
- It can improve the drawing efficiency of users, explore and demonstrate more general geometric properties, and expand the application range of DGS