3D-SPACE OBJECT CONVERSION

E.V. Kop'ev asadiR.KEV@gmail.com

Bauman Moscow State Technical University, Moscow, Russian Federation

Abstract

Computer graphics algorithms at present day allow us to solve one and the same problem in several ways. These algorithms can be ranked in order of distance from the primitives. The proposed concept will implement a modular library and efficiently conduct the work at any level of distance from the primitives. This decision will accelerate the coding, simplify debugging, will make it possible to qualitatively compare the effectiveness of the combined approaches. The study describes the 3D-model storage format and gives the definition of the class of basis objects and their designers. Moreover, we define the set of blending functions and consider some problems in computer graphics. Finally, we give examples of using this concept and propose ideas for further development

Keywords

Computer graphics, computer graphics algorithms, 3D-editors, modular algorithm library, unstructured topology, STL

References

[1] Lin M.C., Manocha D., Gottschalk S. OBBTree: a hierarchical structure for rapid interference detection. *SIGGRAPH 96. Proc. 23rd Annual Conf. on Computer Graphics and Interactive Techniques*, 1996, pp. 171–180.

[2] Moller T. A fast triangle-triangle intersection test. Stanford, Standford university press, 1997.

[3] Laszlo M.S. Computational geometry and computer graphic in C++. Prentice Hall, 1995. 282 p.

[4] Lee D.T., Schachter B.J. Two algorithms for constructing a delaunay triangulation. *International Journal of Computer and Information Sciences*, 1980, vol. 9, no. 3, pp. 219–242. URL: http://link.springer.com/article/10.1007/BF00977785 DOI: 10.1007/BF00977785

[5] Delaunay M.P. Treangulation in 3D. University of West Bohemia in Pilsen, 2002.

[6] Dutr P., Adams B. Interactive boolean operations on surfel-bounded solids. *SIGGRAPH*, 2003, pp. 651–656.

[7] Schifko M., Juttler B., Kornberger B. Industrial application of exact Boolean operations for meshes. *SCCG. Proc. of the 26th Spring Conf. on Computer Graphics*, 2010, pp.165–172. URL: http://dl.acm.org/citation.cfm?id=1925089 DOI: 10.1145/1925059.1925089

[8] Mei G., Tipper J.C. Simple and robust Boolean operations for triangulated surfaces. Cornell University, 2013. URL: https://arxiv.org/abs/1308.4434 (accessed 02.01.2017).

[9] CGAL: The computational geometry algorithms library. URL: http://www.cgal.org (accessed 03.12.2016)

[10] VTK: The visualization toolkit. URL: http://www.vtk.org (accessed 03.12.2016).

[11] DGtal: Digital geometry tools and algorithms. URL: http://dgtal.org (accessed 03.12.2016).

[12] The VCGLibrary. URL: http://vcg.isti.cnr.it/vcglib (accessed 03.12.2016).

Kop'ev E.V. — student of Theoretical Informatics and Computer Technology Department, Bauman Moscow State Technical University, Moscow, Russian Federation.

Scientific advisor — Yu.T. Kaganov, Cand. Sc. (Eng.), Assoc. Professor of Theoretical Informatics and Computer Technology Department, Bauman Moscow State Technical University, Moscow, Russian Federation.