

Generation and Visualization of Voronoi Diagrams

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ABSTRACT

The geometric construction of Voronoi diagrams represents one of the most fundamental concepts in Computational Geometry. Its powerfullness has been extensively demonstrated in many successful applications in a variety of problems in different areas. Several algorithms have been proposed and implemented to generate planar Voronoi diagrams. One successful generation of Voronoi diagrams was recently presented by Sugihara and Iri [1] based on the *incremental-type algorithm*. The principle of the incremental-type algorithm is very simple. It starts with a Voronoi diagram with two or three generators and adds to that diagram a new generator, one by one. This algorithm has been implemented in a *Fortran* program called *Voronoi2* [2].

One of the outputs of *Voronoi2* is a set of data that represents the edges and coordinates of the Voronoi generators. These data contains raw informations that suitably programmed can move the pen of a plotter. However, for practical applications, this is a time consuming and costly process in contrast to an automatic display of the corresponding Voronoi diagram.

In this communication we discuss new facilities for the generation of Voronoi diagrams according to the user specifications of Voronoi generators, which allow a best fit of symmetries; the graphic interface for an automatic visualization of the diagrams and printing facilities for them. An efficient implementation of the whole process to run under MS-DOS/Windows is in progress.

References

1. Sugihara, K. and Iri, M., Topology-Oriented Incremental Method for Construction Voronoi Diagrams Robust against Numerical Errors. *Int. Jour. of Computational Geometry and Applications*, 1992 (to appear).
2. Sugihara, K. and Iri, M., *Voronoi2 Reference Manual*. Research Memorandum RMI 89-04, Faculty of Engineering, University of Tokyo, Japan, 1989.

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