Accepted paper with abstract, SoCG'09

Jean-Daniel Boissonnat, Olivier Devillers and Samuel Hornus

An Efficient Implementation of the Delaunay Triangulation and its Graph in Medium Dimension

We describe a new implementation of the well-known incremental algorithm for the construction of Delaunay triangulations in any dimension. Our implementation follows the exact computing paradigm and is fully robust. Extensive comparisons show that our implementation outperforms the best currently available codes for convex hulls and Delaunay triangulations, and that it can be used for quite big input sets in spaces of dimensions up to 6. To circumvent prohibitive memory usage, we also propose a modification of the algorithm that uses and stores only the Delaunay graph (the edges of the full triangulation). We show that a careful implementation of the modified algorithm performs only 5 to 8 times slower than the original algorithm while drastically reducing memory usage in dimension 4 or above.