

Dr. Delaunay or: How I Learned to Stop Worrying and Love the Triangulations

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Abstract

We attempt to provide a comprehensive and visual summary of geometry processing, surface, and volumetric meshing. More specifically, we investigate methods such as Delaunay triangulations, Delaunay tetrahedrizations, and intrinsic triangulations. Lastly, we also review the impact of geometry processing (e.g., surface simplification, mesh refinement, etc.) on the resulting triangulated or tetrahedrized meshes.

1 LITERATURE LIST

In our report, we will review the following list of academic work—listed in no particular order:

- Constrained Delaunay Tetrahedrization: A Robust and Practical Approach by Diazzi et al., 2023.
 - Tetrahedral meshing in the wild by Hu et al., 2018.
 - TriWild: robust triangulation with curve constraints Hu et al., 2019.
 - Surface Simplification using Intrinsic Error Metrics Liu et al., 2023.
 - Geometry Processing with Intrinsic Triangulations Sharp et al., 2021.
 - Book and Course Notes on Computational Geometry and Topology by Edelsbrunner, 2013; Edelsbrunner et al., 2006.
 - Large Steps in Inverse Rendering of Geometry by Nicolet et al., 2021.
 - Fast tetrahedral meshing in the wild by Hu et al., 2020.
 - Sur la sphère vide by Delaunay, 1934.
 - Surface simplification using quadric error metrics by Garland and Heckbert, 1997.
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