Project Proposal

Project name: Fast Delaunay Triangulation

I am going to try developing a performant implementation of Delaunay Triangulation. Since there are multiple algorithms and approaches, I am going to select the ones that are adaptable to various high-performance techniques. Divide-and-conquer and Sweephull are promising candidates. I am probably going to try both single-threaded and multithreaded versions.

I plan to try utilizing the following technologies:
- C/C++ with GCC
- SIMD (Intel SSE and AVX)
- OpenMP
- Multithreading (pthreads)
- GCC’s auto-vectorize
- OpenBLAS (for matrix multiplication and determinants)

I am going to compare the performance of initial naive implementations with the fast implementations after the various HPC techniques are applied. I am going to report the combination of techniques that give the best performance and the methods that do not affect the performance much or, worse, negatively affect the performance.