Geometric Computing in GSoC'18

Vissarion Fisikopoulos

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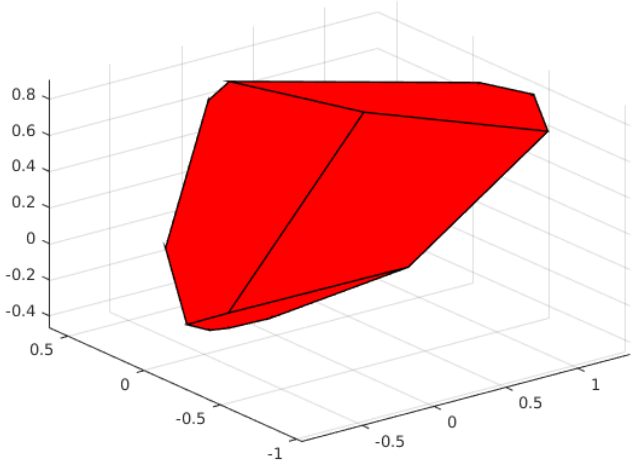
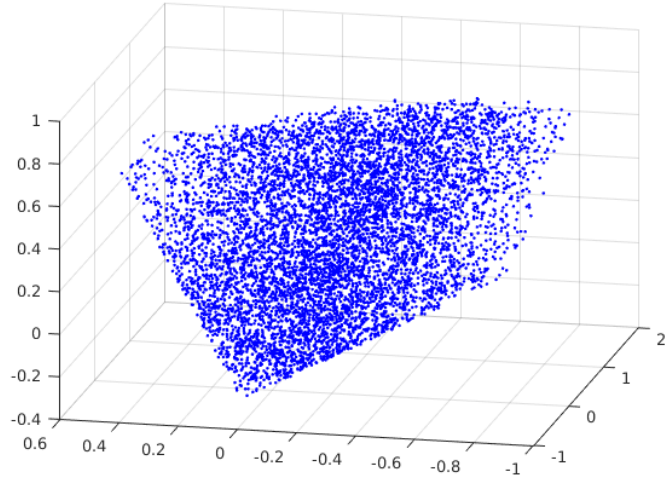
Athens FLOSS Meetup June 2018

1. Efficient R tools for geometrical statistics

- Keywords: Monte-Carlo, random walks, convex polytopes





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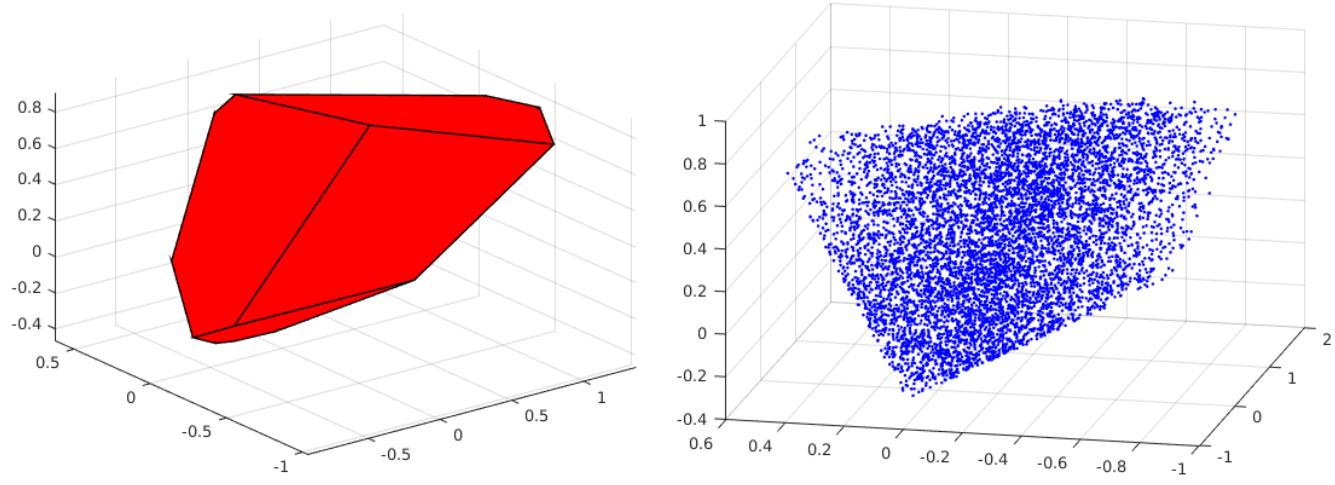

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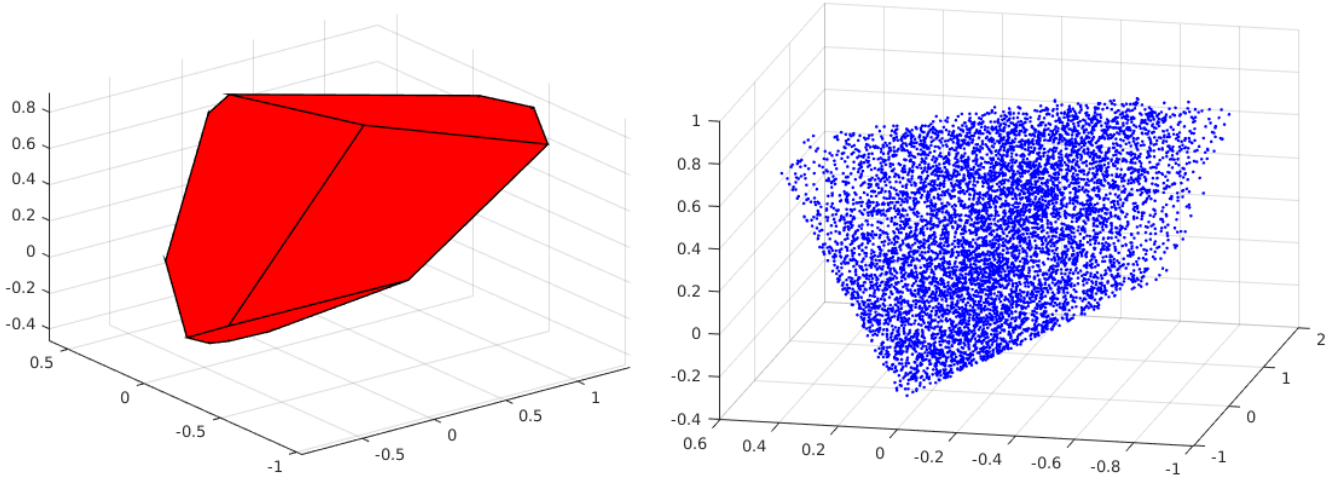

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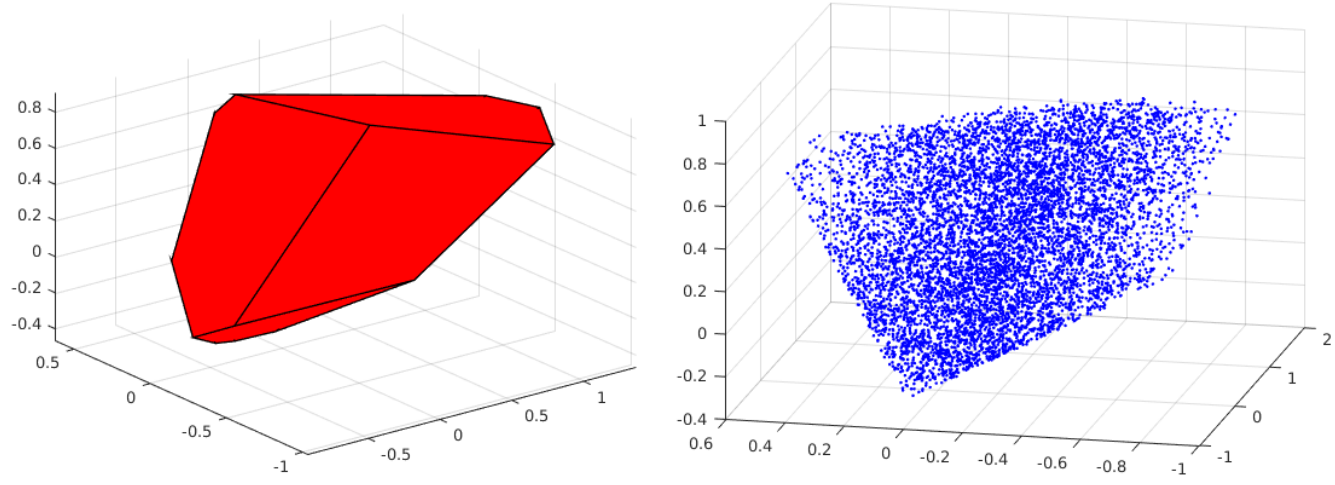

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- Software:
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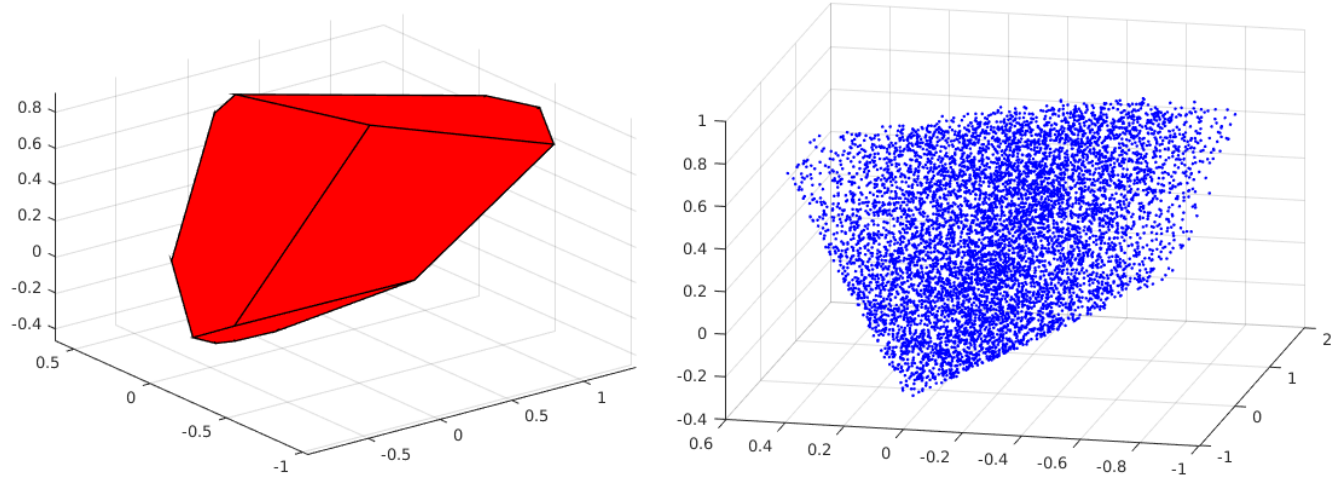

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- Software:
  `https://github.com/vissarion/volume_approximation`
- Project goal:
  1. `R` interface for C++
  2. new features: algorithms, types of polytopes

1. Efficient  tools for geometrical statistics

Community impact & applications

- High-dimensional volume computation (few hundreds), current in R (<15 dims)
- Economic crisis detection, bio-geography, systems and control

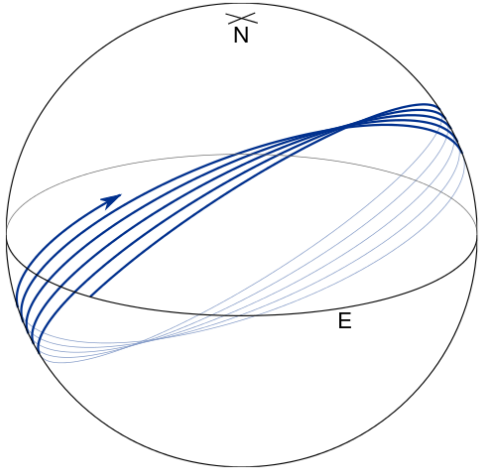
Progress

- draft R interface ready for PR
- started new features implementation
- on schedule
- blog = https://tolischal.github.io/GSoC2018

2. Nearly antipodal points distance accuracy improvement

boost GEOMETRY

- Keywords: Geodesic algorithms, GIS, scientific computing



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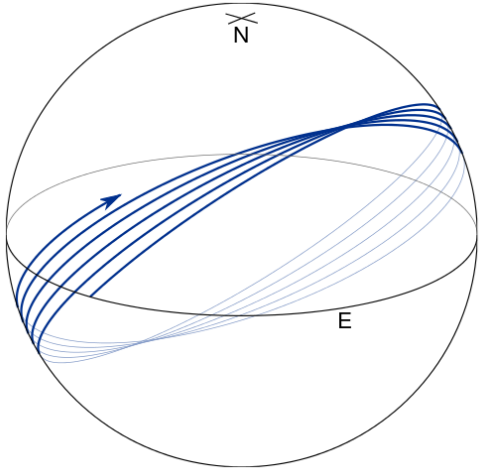

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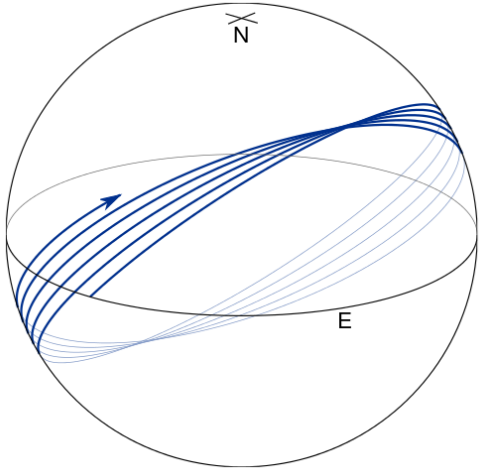

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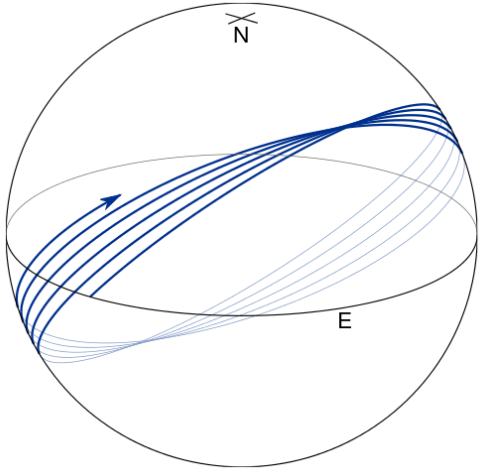

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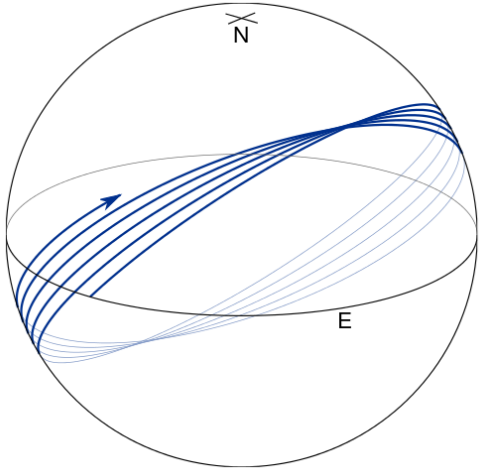

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- Mentors: V.Fisikopoulos, A.Wulkiewicz (Poland)
- Software: `https://github.com/boostorg/geometry`
- Project goal:
  1. accurate C++ geodesic algorithms for nearly antipodal cases
  2. merge to Boost.Geometry

2. Nearly antipodal points distance accuracy improvement

Community impact & applications

- accurate and efficient solutions for corner cases
- GIS applications on the globe

Progress

- pull request: https://github.com/boostorg/geometry/pull/486
- on schedule
- blog = https://adl1995.github.io/inaccuracy-in-boost-geometry-geodesic-algorithms-for-n.html

3. Similarity Between Geometries in boost GEOMETRY

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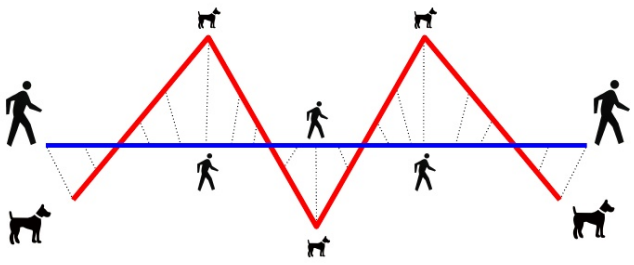
Walking your dog



How long must the leash be?

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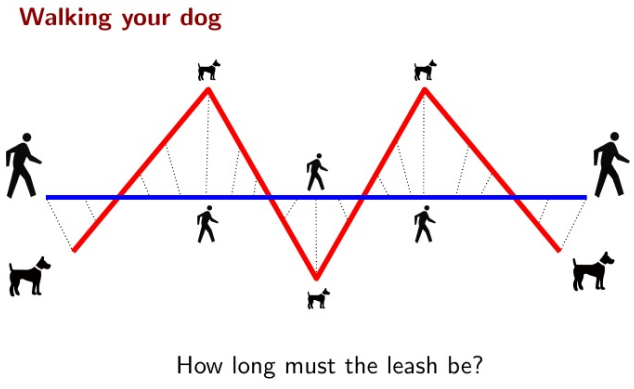

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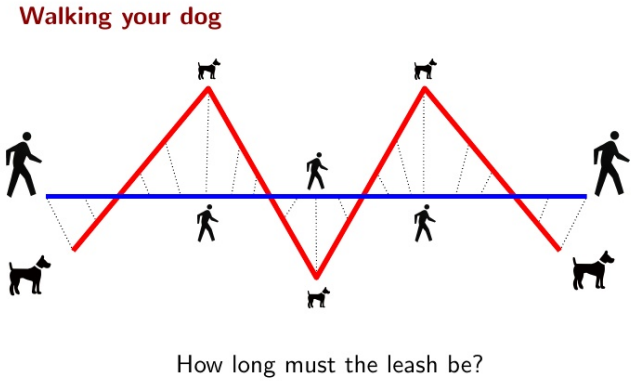

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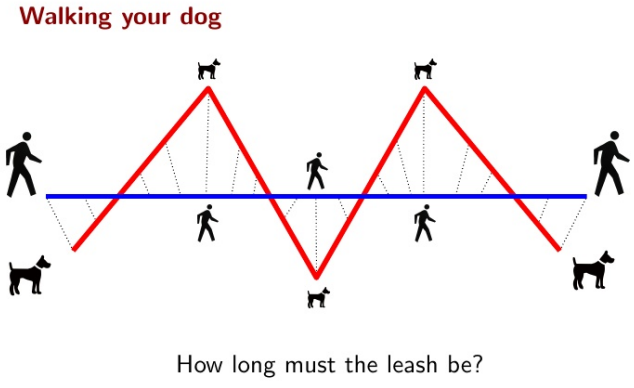

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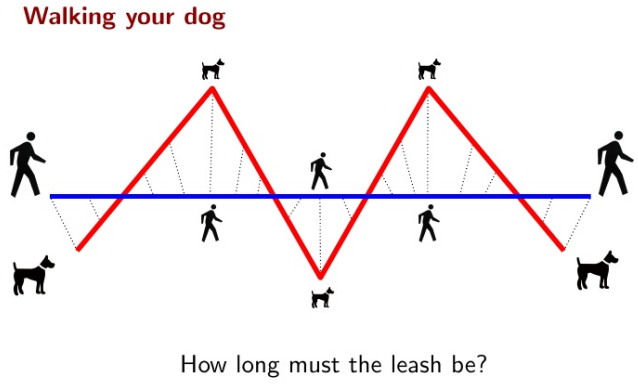

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- Software: https://github.com/boostorg/geometry
- Project goal:
  1. efficient C++ algorithms for Frechet and Hausdorff distance
  2. merge to Boost.Geometry

3. Similarity Between Geometries in boost GEOMETRY

Community impact & applications

- analyse trajectories (from cars to hurricanes)

Progress

- pull request: https://github.com/boostorg/geometry/pull/490
- a bit behind schedule
- blog = https://adl1995.github.io/inaccuracy-in-boost-geometry-geodesic-algorithms-for-n.html

Thanks