Computational Geometry

Curve Reconstruction

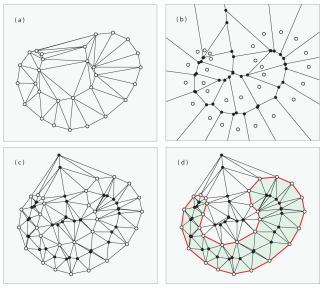
ε-sample

- Let 0<ε<1. A set *S* of points sampled from *C* is an ε-sample if each point *x* in *C* has point *p* in *S* such that $|x-p| \leq \varepsilon\rho(x)$.
- Forces sample to be dense in complicated sections of *C*.

the CRUST Algorithm

- The correct edges are a subset of Del(S).
- For sufficiently small ε
  - The Voronoi vertices V of Vor(S) lie near M(C)
  - Any circumscribing circle of an incorrect edge of Del(S) crosses the medial axis M(C)
  - An incorrect edge e of Del(S) cannot also appear in Del(S ∪ V) because a circumscribing circle for e contains a vertex in V.
  - Each correct edge of Del(S) also appears in Del(S ∪ V).

CRUST



Computational Geometry

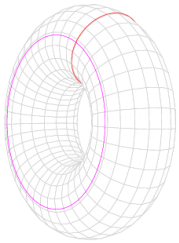
The Heat Equation

Heat Equation

- A parabolic partial differential equation
- Describes distribution of heat over time
- $u(x, t)$: $\partial u/\partial t = \partial^2 u/\partial x^2$

Poincaré Conjecture

- Every simply connected closed 3-manifold is homeomorphic to the 3-sphere.



Ricci Flow

- Richard Hamilton 1980
- Generalization of the curve deformation flow
- Singularities and surgery