Contributions

- Fast
- Robust and flexible
- Smooth function
- Geometric invariant

Ridge and ravine detection

- Ridges and ravines
  - Extrema of the max/min principal curvatures along their corresponding principal directions
  - Non-trivial task on meshes
  - Involving fourth-order surface derivatives

Local geometry function fitting

- Least-square fitting of a cubic surface to the neighborhoods at each vertex $p$
  $$f(x, y) = \frac{A}{2}x^2 + Bxy + \frac{C}{2}y^2 + Dx + Ey^2 + Fxy^2 + Gy^3 + Hx^4 + Iy + J$$

Domain mesh

- Simplified mesh
- Based on adaptive local fitting simplification
- Partition of the original mesh

Barycentric coordinates

- Barycentric coordinates of $p$ according to a triangle
  $$p = uP_1 + vP_2 + wP_3$$
  $$u + v + w = 1, 0 \leq u, v, w \leq 1.$$