Parametric Pseudo-Manifolds

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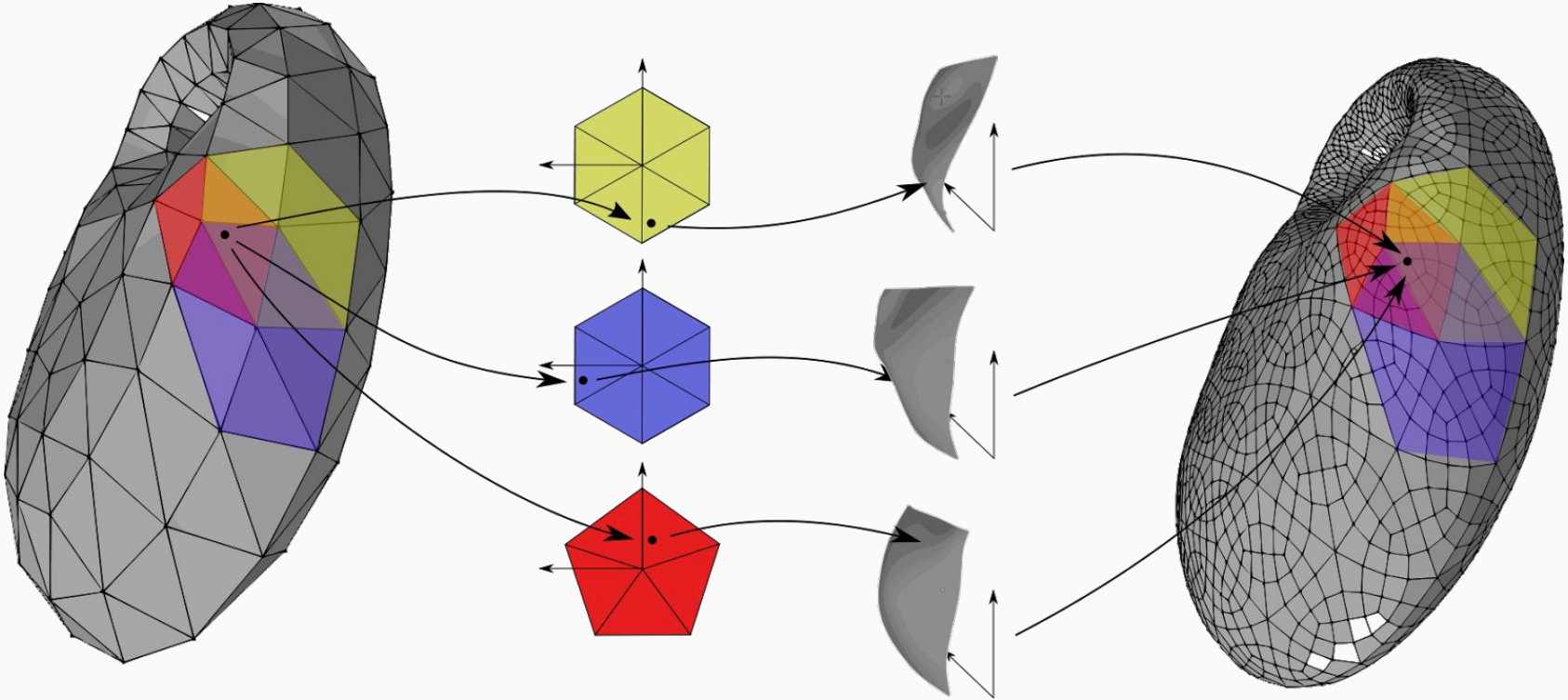
Surface Approximation

- Space is continuous, data is discrete
- Approximations can be made
  - Meshes - more triangles
  - Parametric surfaces - control points
- ‘Good’ approximation is problem-specific
- Some problems are just that big

PPMs - A Hybrid Approach

- Method of gluing approximations[1]
- Assemble Bezier patches into full surface
- Bonus features
  - Not iterative, re. Subsurf
  - Random access
  - Separate topology from data

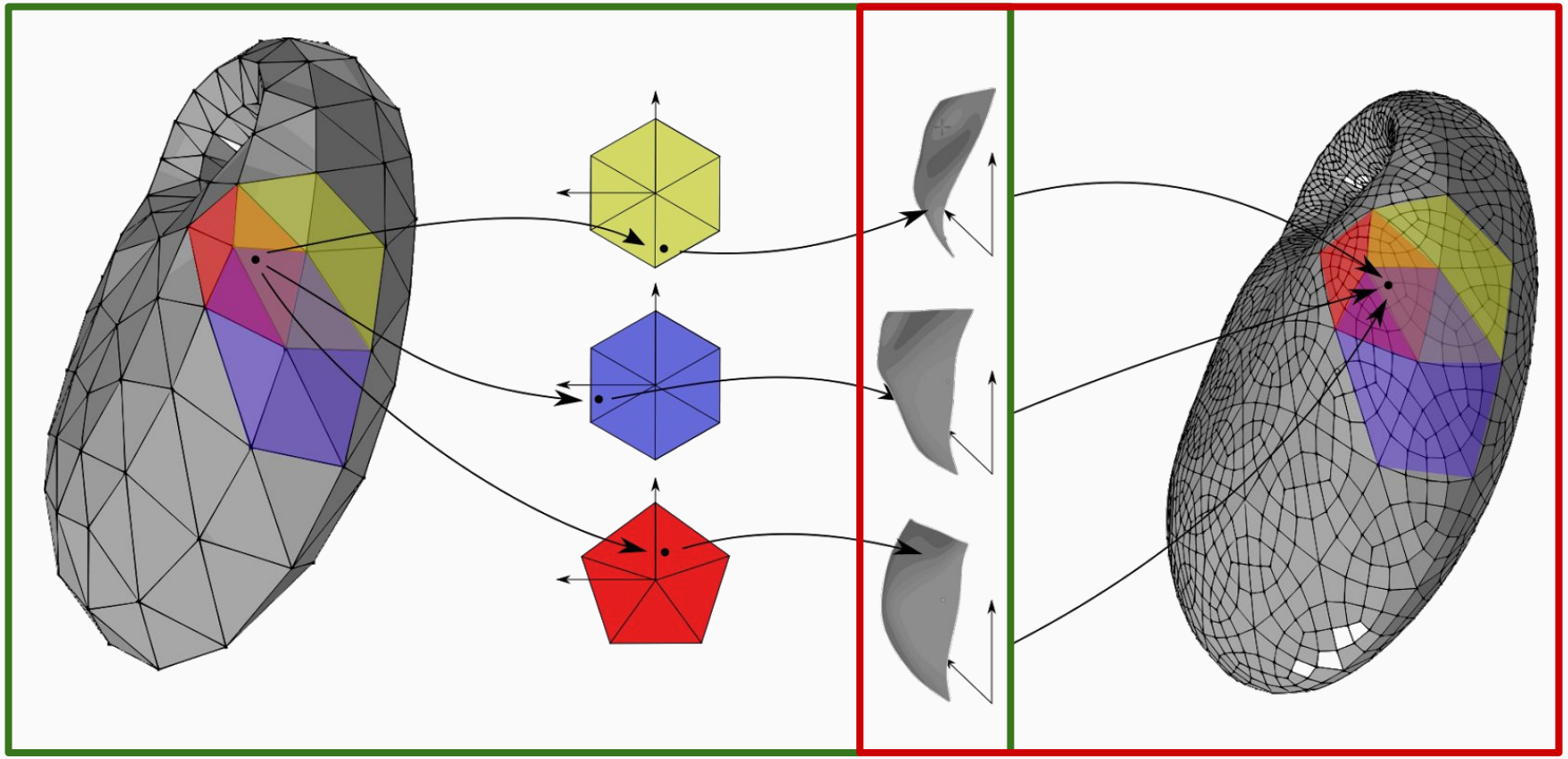
PPMs Illustrated



Inherent Parallelism

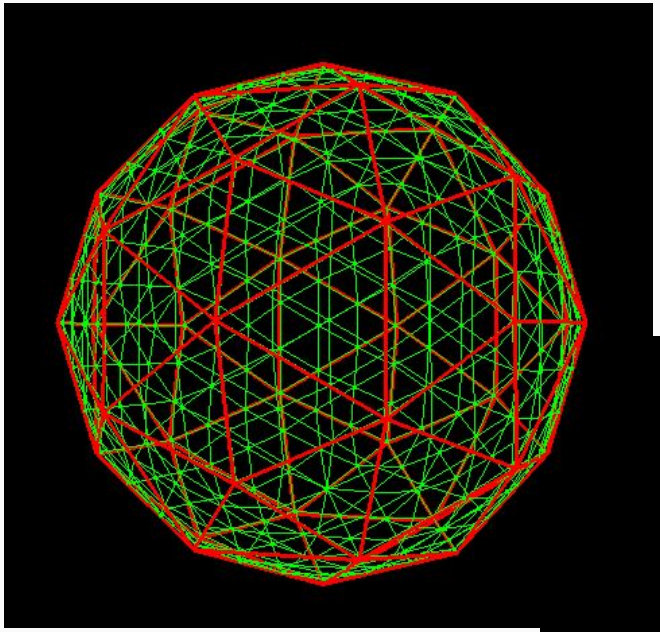
- Geometry is variable but local, math is per-patch
- Topology is constant
- Split into topology pre-processing + tight nondivergent geometry loop

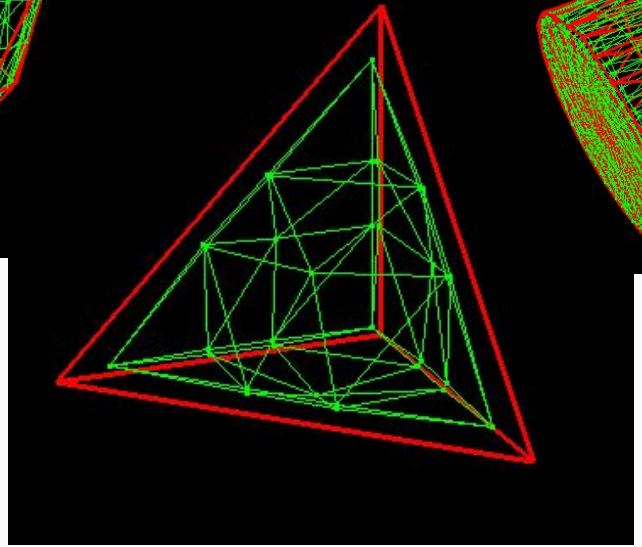
PPM Calculation Stages

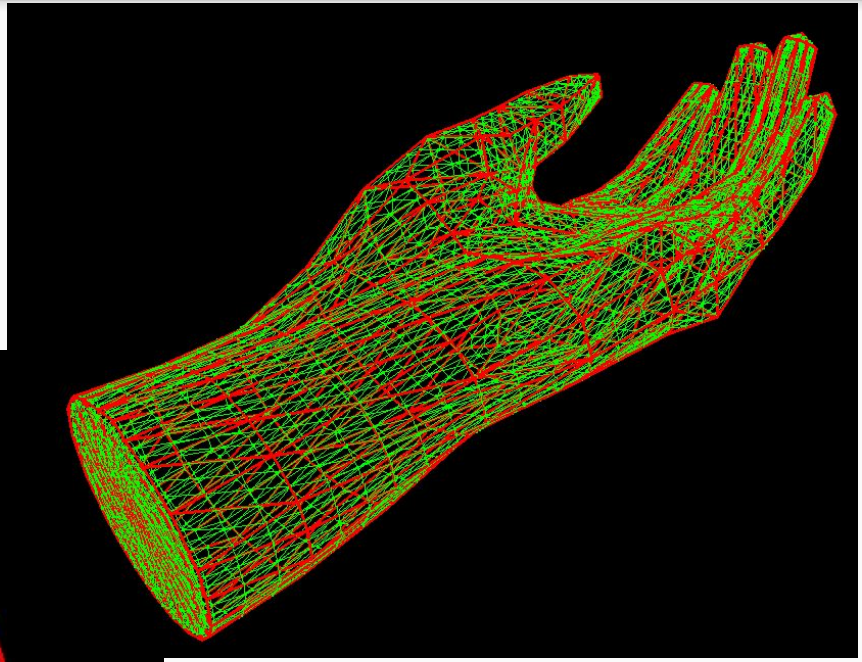


Demo

Backup - PPM Examples







Next Milestones

- Milestone 2: Optimize violently
- Milestone 3: Bugfixing + profiling
- Final: Maybe extra features?
  - Deformation
  - Normal interpolation

Sources

1. Siquiera, Xu, Gallier, “Construction of C^{∞} Surfaces from Triangular Meshes Using Parametric Pseudo-Manifolds”, SEAS Technical Report 877, April 2008, http://repository.upenn.edu/cis_reports/877/