Fitting of Geometric Entities

Pagoda Systems
Software Solutions

Using the software module ***Fitting***, geometric entities can be fitted to digital point clouds.

Applications

- Measuring and inspection of geometric entities in unstructured or meshed point clouds
- Surface reconstruction

Features

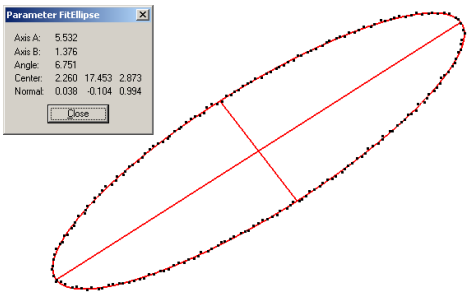
- Fitting of geometric primitives: line, circle, ellipse, plane, sphere, cylinder, and cone
- Handles incomplete point clouds: Fitting of circular and elliptic arcs and spherical, cylindrical, and conical segments
- Fitting of boundary elements: Maximum inscribing circle and sphere, minimum enclosing circle, sphere and cuboid
- Fitting of smooth spline curves to tolerance
- Optional: Comparison of point cloud with fitted entity and reporting of deviations (color plot)

Methods

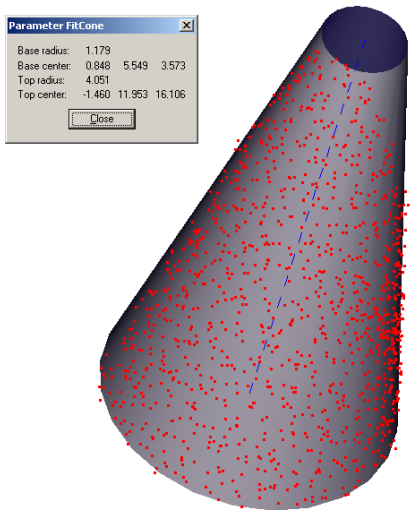
- Minimization of orthogonal distances by Gaussian least squares
- Boundary elements: Chebyshev approximation and non-linear optimization
- Spline curves: Parametric approximation with energy minimizing splines

Implementation

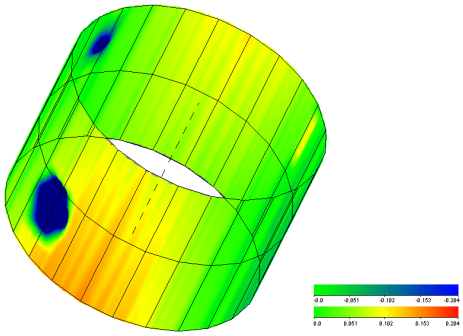
- Programming language C++
- Modular design either for the integration into existing software systems or as stand-alone application including visualization (OpenGL)
- Support of multi-core architectures and 64-bit platforms



Ellipse fitting



Cone fitting (segment)



Deviations between point cloud and fitted entity (color plot)

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