Nov. 5, 2015

BGCE project: CAD-integrated topology optimization tool

Meeting protocol: Second Milestone

People present: Dirk Hartmann (SIEMENS), Utz Wever (SIEMENS), Tobias Neckel (TUM), Benjamin Rüth, Erik Wannerberg, Saumitra Joshi, Severin Reiz, Anna Yurova, Juan Carlos Medina, Friedrich Menhorn

BGCE Presentation :

1. Introduction/Project management (Benni)
2. Topology optimization (Friedrich)
3. Surface Extraction (Juan Carlos)
4. Live-Demo
5. B-Spline Fitting (Anna)
6. Summary (Benni)

NB: For content see presentation slides

Discussion:

1. Siemens accepts **Python** as programming language for the surface reconstruction part.
2. **ToPy** not available on the web anymore: ToPy may be used, but to publish the "integrated topology optimization tool" as Open source might run into license problems → contact owner and check license
3. **Surface fitting** local (connect patches), least squares global. For complex geometry leads to a big problem and will be very expensive. A detailed description of the minimization problem will be given in the report.
4. Problems in surface reconstruction of torus: One approach might be **Pre-smoothing** of input data and to optimize parameters (adaptivity)
5. **GUI** idea: might be included as plugin in FreeCAD. Problem: cannot be used with other CAD programs.

Question: What are the biggest remaining challenges?

Conversion back to CAD and adaptive and topology safe surface reconstruction

6. **Conversion** between Beziér and B-Spline just basis conversion – still to be converted to **CAD** world
7. **Adaptive** and **topology safe** dual contouring: in case this is too difficult runtime will be longer (use smaller global cell sizes)
8. Suggestion: build a simple **prototype pipeline** (with conversion back to CAD)
9. Documentation: Code commenting with **Doxygen**