Technische Universität München
Lehrstuhl Computation in Engineering

Implementation of geometric modeling tools based on the C++ libraries of QT and OpenCASCADE

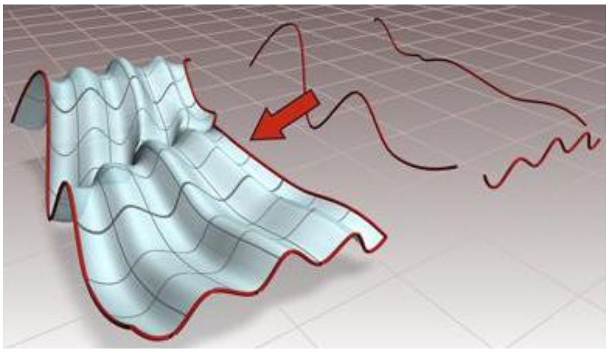
The basis for every numeric simulation is a geometric model. In classical Finite-Element analysis this model has to be discretized in a pre-processing mesh generation step. In this software-lab the existing pre-and post-processing *TUM.GeoFrame* framework will be extended by geometric modeling features.

For the generation of geometric models there exists a large number of modeling tools and frameworks. Every modeling toolkit is based on a geometric kernel such as for example ACIS or OpenCASCADE. The communication between geometry kernel and user can be realized with the help of graphical user interface libraries (GUI). This software-lab will extend an existing framework based on the geometric kernel OpenCASCADE [1] and the GUI-library QT [2] by geometric modeling features to generate and modify geometric shapes.

Tasks:

- Getting familiar with object-oriented programming in **C++**
- Getting familiar with the graphical user interface (GUI) libraries of **QT**
- Getting familiar with the geometric kernel **OpenCASCADE**
- Getting familiar with geometric **free-form** modeling techniques (Splines, NURBS)
- Implementation of geometric modeling features such as drawing, scaling, moving, rotating of objects like lines, curves, surfaces and volumes
- Implementation of a GUI-based intuitive geometric modeling concept
- Integration of the implemented features in the **TUM.GeoFrame** framework

Example: GUI with Qt



Example: Modeling with OpenCASCADE

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References

[1] http://www.opencascade.org/
[2] http://qt.nokia.com/