



Bavarian Graduate School of Computational Engineering

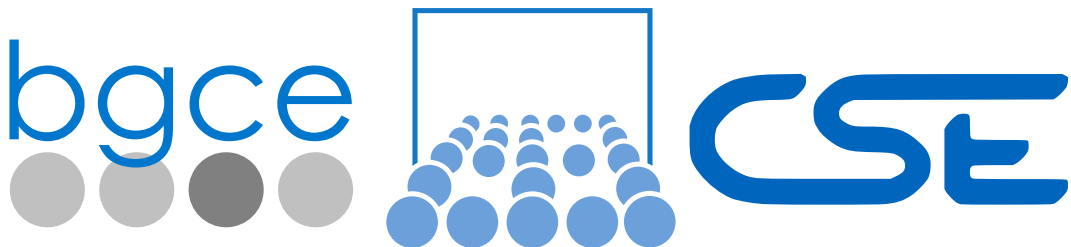
Technische Universität München

Installation Guide

CADTOPCAD-a CAD to Optimized Topology to CAD Software Tool

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Preface

The Bavarian Graduate School of Computational Engineering (BGCE) honours project at the Computational Science and Engineering (CSE) Institute of Technische Universität München (TUM) is a 10-month project where students conduct research on cutting-edge topics in the field of Computational Engineering, in cooperation with a partner in industry or academia. The 2015–16 project is titled *CAD-Integrated Topology Optimization* and is initiated and supervised in a cooperation between TUM and Siemens AG in Munich.

Acknowledgments

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1 ToPy

1.1 Prerequisites

For installing Topy, we need some additional software beforehand.

- Python (>2.7)
- Numpy (Usually provided by Python distribution)
- Pyvtk:
 - `sudo apt-get install python-pip`
 - `sudo pip install pyvtk`
- Pysparse:
 - `git clone git:://pysparse.git.sourceforge.net/gitroot/pysparse/pysparse/`
 - `cd pysparse`
 - `sudo python setup.py install`

Furthermore, since by default the output .vtk files from Topy are binary, we need to change them to ascii. Hence, in the Topy source file `core/visualization.py` in the method `_write_legacy_vtu(x, fname)` (line 160), change in line 194 `binary` to `ascii`.

1.2 Install ToPy

Finally, we can install Topy by calling
`sudo python setup.py install`
in the root directory of Topy.

1.3 Test Installation

Enter one of the folders in examples (e.g. `examples/cantilever`) and execute a Topy test run by
`python optimize.py <example.tpd-file>`

2 OpenCascade

2.1 Install OpenCascade

We use the OpenCascade not from the official webpage but from the Git repository:

- `git clone git://github.com/tpaviot/oce.git`
- `cd oce`
- `mkdir build`
- `cmake ..`
- `make`
- `sudo make install`

In the make step, one can use the `-jx` parameter where `x` is the number of processor to build in parallel. These steps are in accord with the installation guide on the git page itself. One can also use the `cmake-gui` to change some of the build configuration if need be (e.g. include OpenMP support).

2.2 Test Installation

Test the installation by calling

```
make test
```

They should all be successful.

3 CADTOPCAD

3.1 Prerequisites

- Topy
- OpenCascade
- CPPUnit:
 - `sudo apt-get install lib-cppunitdev`