

Software Lab:

Modeling: ★★★★★
Mathematics: ★☆☆☆☆
Programming: ★★★★★

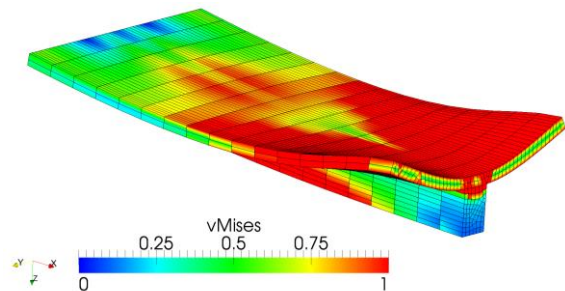
Distributed Visualisation for SOFiSTiK using ParaView

Setting

Solving structural mechanical problems is an every day's task for engineers in fields of practical applications. The engineer is supported by software tools such as CAD packages or finite element programs for stress and strain computation of structures. Nowadays, more and more 3D based computations are used, and most of the

finite element simulation packages have integrated support for 3D CAD input files or a direct data exchange mechanism. On the other hand, a deep 3D data exploration of huge simulation results is unfortunately not state of the art at the moment. Plausibility analyses e.g., are much easier, if the engineer can have a good look at the results from every angle using his own laptop whereas the simulation itself might run in a cloud-like infrastructure at a remote location.

This project will focus on a distributed 3D visualisation of SOFiSTiK results using a client-server concept and a ParaView frontend. SOFiSTiK is a commercial finite element package suited very well for civil engineering purposes. ParaView is an open-source, multi-platform data analysis and visualisation frontend built on top of the visualisation toolkit (VTK) libraries written in C++. The project shall enable the treatment of very huge result files on a server backend, filtering and pre-processing the data, and sending them via sockets to the client frontend which visualises the results using ParaView.



Task

- analyse and interpret the SOFiSTiK .cdb file in order to extract all relevant geometry and result data files in a fast and efficient way
- write a VTK reader able to parse the cdb file partially or completely, and store the geometry in an appropriate internal format
- establish a standard interface definition for data transfer from client to server and vice versa
- write a client-server architecture using C++ able to treat and preselect relevant result data, and transmit it via socket communication from server to client using boost libraries, e.g.
- write a ParaView plugin able to interpret and visualise the received data

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References

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- [2] <http://www.paraview.org> ; http://www.paraview.org/Wiki/ParaView/Plugin_HowTo
- [3] <http://www.vtk.org/VTK/img/file-formats.pdf>