# 1. Overview

This is a documentation for the code of Hex2Spline which supports the spline construction method in TH-spline3D.

# 2. Compiling instructions

## 2.1. Tools

CMake, Visual Studio (2017) with MKL installed

## 2.2. Explanation of three folders

build: VS project

io: I/O files

src: source files

* CMakeList.txt and cmake are used in CMake for compiling
* cpp contains source codes

## 2.3. External libraries

Eigen: <http://eigen.tuxfamily.org/index.php?title=Main_Page>

* Download the package, unzip it and put it somewhere and record the path (PATH\_EIGEN).
* In src/cmake/ FindEigen3.cmake, add PATH\_EIGEN in the PATHS of find\_path (line 73)

I have included it on the server; check the lib folder.

## 2.4. Compiling

* Open CMake and set “source code” and “binaries” to be src and build, respectively.
* Choose default compiler and then click “Configure”. Usually it would fail the first time. Ignore it and click “Configure” again and it will be all right (because some intermediate files are needed).
* Next click “Generate” and a VS project will be generated in the build folder.
* Go to build folder, open ProjectName.sln and you will find three projects in this solution in VS. Right click the project with ProjectName and “Set as Startup Project”.
* Change Debug mode to Release, and change Win32 to x64. To change to x64, click “Win32” -> “Configuration Manager”. Under “Active solution platform”, click “Win32” -> “New”. Then select “x64” and click “OK”. Right click the project , then “Properties”, followed by “Intel Performance Libraries”. Select “Parallel” for “Use Intel MKL”, select “Yes” for “Use ILP64 interfaces”. Next under “Linkder” -> “Command Line”, remove “/machine:X86”.

# 3. Executing instructions

* 3.1. Make sure Release mode is on rather than Debug in VS because it is much faster.

How the program works and I/O, you can check the following article.

Y. Yu, X. Wei, A. Li, J. G. Liu, J. He and Y. J. Zhang: **HexGen and Hex2Spline: Polycube-based Hexahedral Mesh Generation and Spline Modeling for Isogeometric Analysis Applications in LS-DYNA.** Submitted to Springer INdAM Series, 2020.