## Digital 3D Geometry Processing Exercise 1 - Introduction

January 16, 2024

## Note

Hand in a .zip compressed file renamed to Exercise*n*-GroupMemberNames.zip where *n* is the number of the current exercise sheet. It should contain:

- **Only** the files you changed (headers and source). It is up to you to make sure that all files that you have changed are in the zip.
- A readme.txt file containing a description on how you solved each exercise (use the same numbers and titles) and the encountered problems.
- Other files that are required by your readme.txt file. For example, if you mention some screenshot images in readme.txt, these images need to be submitted too.
- Submit your solutions to Gradescope before the submission deadline.

## **Coding Exercise (10 pts)**

The goal of this exercise is to set up coding environment for the exercises in the course and to get started with Eigen library.

- Download dgp-exercise1.zip and extract into OpenFlipper folder.
- Compile OpenFlipper together with the plugin Plugin-DGPExercise.
- Read Eigen documentation and solve the small sparse linear algebra system Ax = b, where

$$A = \begin{bmatrix} 0 & 1 & 0 & -2 & 0 \\ -1 & 0 & 3 & 0 & 4 \\ 0 & 0 & 0 & 5 & 2 \\ -1 & 3 & 0 & 0 & 0 \\ 0 & 0 & 1 & 1 & 1 \end{bmatrix}$$

and  $b = \begin{pmatrix} 1 & 10 & 8 & 0 & 3 \end{pmatrix}^T$ . You should set up the linear system with Eigen. Choose a proper sparse solver to solve for the variable *x* and output the result as well as the matrix *A* and vector *b*. For the exercise, you will need to fill in the missing code in the EigenTutorial.hh and EigenTutorial.cc files.

*NOTE:* Your code MUST at least compile without any issue for you to get a passing grade.