**Braced Excavations**

**CEA 12/12/23**

**Guide to using the codes.**

1. Edit MATLAB script geomaker.m for the size of analysis needed and excavation information
2. Run geomaker.geo > geomaker.geo
3. Read geomaker.geo into GMSH
4. In GMSH generate a 3D mesh remembering to state element order as 2, so that 10-node tetrahedra are produced > geomaker.msh
5. Run readGmsh.jl on geomaker.msh, ensure header is the same as input to geomaker above (i.e. dims of excavation etc.)
6. readGmsh.jl produces csv and txt files
   1. Excavation1.txt contains a list of the 3D elements excavated in stage 1, etc. List is by element number
   2. bc.csv contains boundary conditions in the standard format, i.e. each line starts with a DOF number followed by the Dirichlet BC value
   3. coord.csv is the nodal coordinates
   4. etpl2.csv contains the element topology for the 2D elements (i.e. excavation faces) and etpl3.csv contains the element topology for the 3D elements. **These are files with no element numbers in them. (So far that has been OK as we have just used the 3D elements but for the full code we need to be able to reference all the elements by number.)**
   5. Xz-Wall1.txt is the xz face of excavation stage 1, listing the 2D elements that must be activated at this stage
7. jEPfe2 is then run using a setup??.jl file appropriate, e.g. setupcubeTet.jl which reads the csv and txt files produced above and runs the FE analysis
8. Output folder contains fles that can be read in Paraview for visualisation

e.g. in current analysis etpl2 has 112 entries and these are numbered in the .msh file from 1 to 112. etpl3 has 5824 entries 113 to 5936 which tallies.

**On desktop**

FE code

C:\Users\des0cea\Code23\BracedFEM\jEPfe2

Linked to Github jEPfe2 repository

**GMSH code**

C:\Users\des0cea\Code23\BracedFEM\gmsh

Contains subfolder geomaker which houses the MATLAB script

**On Linux machine**