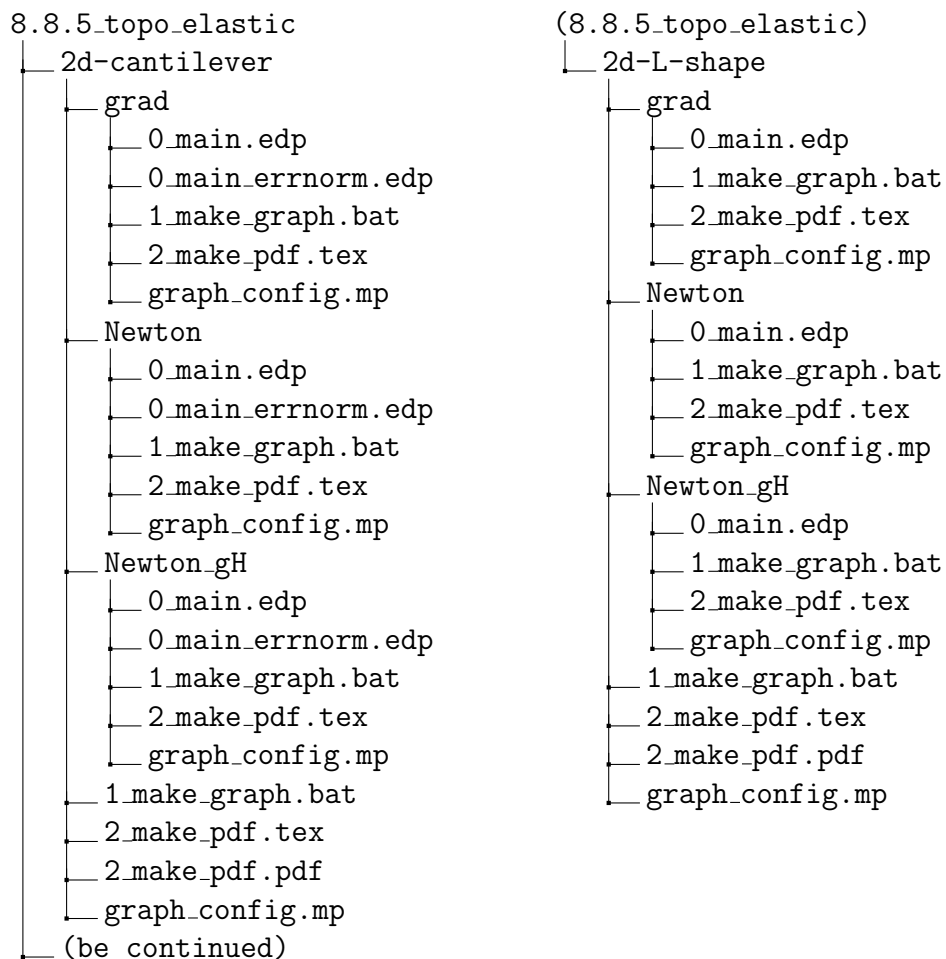


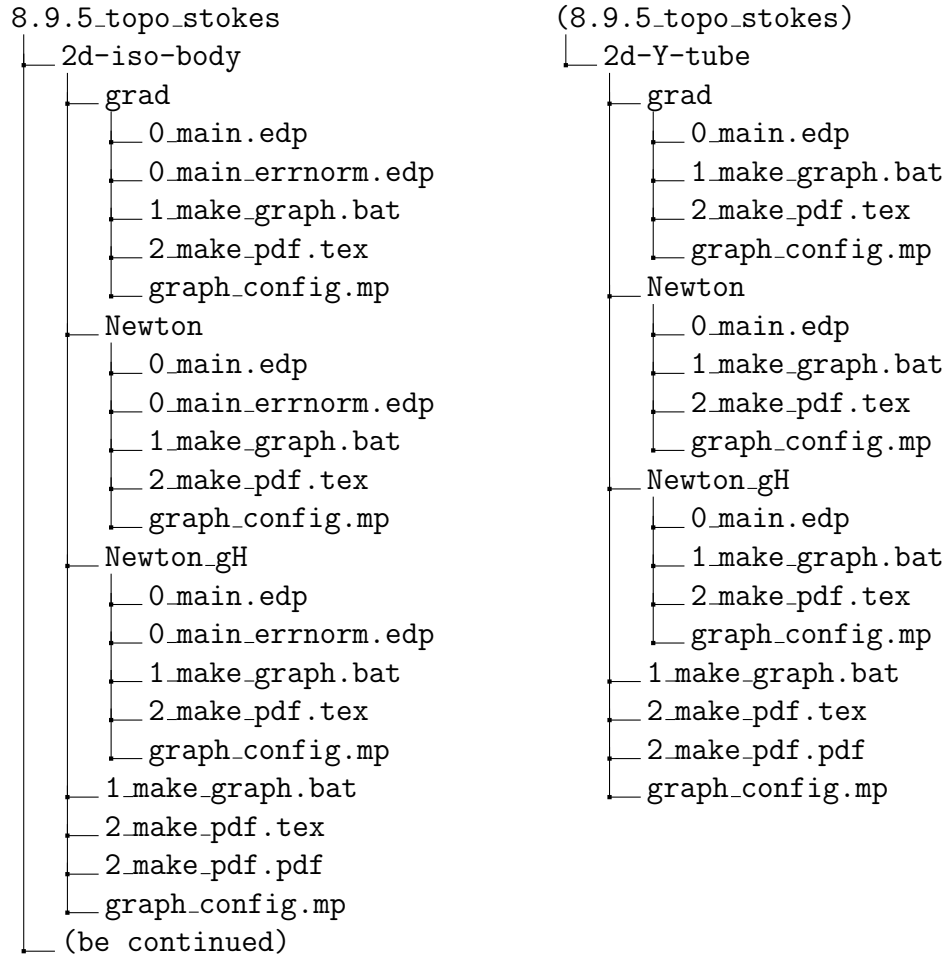
Usage of FreeFEM programs attached to Chapter 8 in “Shape Optimization Problems”

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1 Tree of folders and files





2 Explanation of folders and files

The index number of **8.8.5** in the first folder name **8.8.5_topo_elastic** corresponds to Section 8.8.5 in the book. The folder name **2d-cantilever** refers to the type of problem. The folder names **grad**, **Newton** and **Newton_gH** contain the script for solving the problem using the H^1 gradient method, H^1 Newton method and H^1 Newton method using Hesse gradient, respectively. In each folder, the roles of files are as follows:

- **0_main.edp** is an executable file written in the FreeFEM language. You can edit it by a text editor. To run the program, **FreeFEM** (<https://freefem.org/>) has to be installed.
- **0_main_errnorm.edp** is provided for evaluation of distance $\|\theta_k - \theta^*\|_X$ from an approximate minimum point θ^* .

- **1_make_graph.bat** is a batch file for Windows system to make graphs from the output files obtained by running **0_main.edp** and **0_main_errnorm.edp** (if there is) using **MetaPost**. To run the program, a **T_EX** distribution have to be installed. In the distribution, for example,

C:/texlive/2020/bin/win32/mpost.exe

is used. If the batch file does not work, you can type in

%mpost graph_config.mp

on **Command prompt** for Windows and **Terminal** for Mac. By running the command, graph files in **EPS** format will be generated.

- **2_make_pdf.tex** is a **T_EX** file to create a PDF file from the **EPS** files where all the graphs are plotted.
- The files **1_make_graph.bat** and **2_make_pdf.tex** in parent folders are made available after **0_main.edp** and **0_main_errnorm.edp** (if there is) in all the child folders are executed. The files **2_make_pdf.pdf** in parent folders are the output files generated by running **2_make_pdf.tex**.