

## Exercise 2

### APDL Scripting

The aims of this lab are to learn ...

- ... how to use ANSYS' scripting capabilities
- ... how to create and load an ANSYS input file
- ... how to find and use appropriate ANSYS (APDL) commands

#### Background

There are different ways to use the ANSYS software:

1. Using the GUI (graphical user interface) and picking buttons with the mouse
2. Using the GUI and typing commands into the command line of the GUI
3. Copying blocks of commands from a text file into the command line of the GUI
4. Read a whole input file into the GUI by using the `/input, filename` command
5. Start a batch job run using the launcher window not opening the GUI at all
6. Submit an ANSYS batch job using a professional queuing system on a super computer

You already used the first method during exercise 1 which is the best alternative for simple models and beginners. Now we shall learn about method two, three and four that are advantageous when repeating an analysis several times with varying parameters or when you need additional flexibility.

#### Aim

Take exercise 1 and create an ANSYS input file. All steps that you performed earlier using the mouse in the GUI now have to be performed by using the respective ANSYS commands. In the end, you should have a working APDL script file.

#### Steps

- Go to the Lab's home page and download the template input file  
<http://pacioli.mathematik.uni-ulm.de/felab09>  
Place it in your home directory and open the template in a text editor of your choice. Then add the missing ANSYS commands step by step
- Try out the commands by copying them into the GUI's command line, one by one
- You can also paste multiple lines into ANSYS' command line, if you want to execute more than one command at once

- Use the online help system to get information about the commands' names and syntax. E.g. press the help button on dialog windows in the GUI. Or type **help, *command*** into the command line to get detailed help on a specific ***command***.
- **Comments** in the script are preceded by an exclamation mark ("!") – *everything on the same line following this symbol is ignored by the interpreter!* If you want to turn off a line in your file, simply put a "!" right before it.
- If you want to run your script as a whole, use the command **/input, <filename>** to execute the specified script file **<filename>**
- Available text editors:
  - gedit
  - kate
  - nedit
  - Emacs
  - Vim
  - ... and more

Given

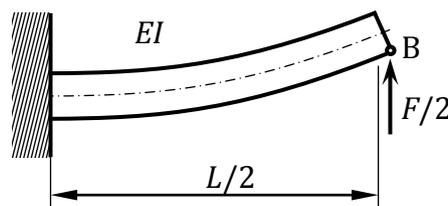


Fig. 1: Cantilever beam (half of beam under 3-point bending).

Relevant geometrical and material data for our problem are given in Table 1:

$F/2 = 2,500 \text{ N}$	Force at point B
$L/2 = 1,000 \text{ mm}$	Half length of the full 3PB beam
$h = 60 \text{ mm}$	Height of the beam's cross section
$t = 20 \text{ mm}$	Thickness of the beam's cross section
$E = 210,000 \text{ N/mm}^2$	Young's modulus
$\nu = 0.3$	Poisson's ration

Table 1: Geometric and material data