

Task №1
PLANE STRESS TENSION OF A PLATE WITH A HOLE

Individual tasks – plates in shape of letters.

Consider a problem of a plate tension for the plate in the shape of the letter with a small round hole (the hole can be cut out in any part of the letter). The bottom edges of the letter should be rigidly fixed, and the top edges are loaded with uniform tension. Take the geometrical dimensions of the letter and the load value similar to those of the example problem. If possible, take advantage of symmetry when building the domain. Consider the plate to be made of any elastic isotropic material. The objective is to conduct plane stress structural analysis and define maximal stresses in the plate. Perform computations in ANSYS (both in interactive and command mode) and FlexPDE, and compare the results. Estimate convergence of results (displacements u_x and u_y) for different sizes of finite element mesh. Present a report.

Requirements to the report.

The report should contain the name of the student, the full description of the problem and the results obtained in ANSYS using both interactive and command modes, and in FlexPDE. For ANSYS interactive mode describe the main steps of the modeling. Text of input files for ANSYS and FlexPDE should be also included in the report.

Provide the following computation results:

- finite element mesh with boundary conditions
- picture of the deformed shape
- pictures of the displacements distribution (for all components of the displacement vector)
- picture of the displacement vector distribution
- pictures of the stresses distribution (for all components of the stress tensor)
- pictures of the strains distribution (for all components of the strain tensor)

Table 1. Suggestions for domain shape.

Variant No.	Domain shape	Student name
1	Σ	Губанов Александр Сергеевич
2	V	Догаев Никита Сергеевич
3	M	Завялкин Денис Витальевич
4	Y	Катасонов Никита Андреевич
5	L	Кириллова Елена Владимировна
6	E	Крабченко Руслан Андреевич
7	Λ	Лушпанов Андрей Александрович
8	N	Непряхин Даниил Олегович
9	F	Петров Илья Сергеевич
10	Z	Половинкина Дарья Александровна
11	W	Ражук Никита Викторович
12	X	Ривкин Михаил Борисович
13	A	Сенчукова Ангелина Александровна
14	К	Степанова Ирина Александровна
15	К	Федоров Юрий Владимирович
16	Н	Филоненко Никита Сергеевич
17	T	Шагал Анастасия Михайловна
18	Ф	Щукин Константин Вадимович
19	I	Kamps Jeroen