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

Individual assignments – plates in the shape of letters.

Consider a problem of a plate tension for the plate in the shape of the letter <u>with a small round hole</u> (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 (<u>both in interactive and command mode</u>) and FlexPDE, and compare the results. Define maximal stresses in the plate and plot a graph of axial stresses along the characteristic path passing through the point of maximal stress.

In ANSYS, <u>estimate convergence of results (displacements UX and UY) for different sizes of finite element mesh and find optimal parameters for the finite element mesh</u>. Make conclusions and present a report.

<u>Requirements to the report.</u>

The report should contain the name of the student, the full description of the problem with the domain sketch 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 ux and uy)
- picture of the displacement vector distribution
- pictures of the strains distribution (for all components of the strain tensor ε_{xx}, ε_{xy}, ε_{yy})
- pictures of the stresses distribution (for all components of the stress tensor σ_{xx}, σ_{xy}, σ_{yy})
- graph of axial stresses (σ_{xx} or σ_{yy}) along the characteristic path
- analysis of convergence for displacements (can be presented as a table or graph)
- conclusions on results

Table 1. Suggestions for domain shape.

Variant No.	Domain shape	Student name
1.	A	Бобовников Николай Алексеевич
2.	K	Габричидзе Лука
3.	X	Гбамметон Шарль Жюдикаель (Charles Gbammeton)
4.	Σ	Гладкова Ксения
5.	M	Дремов Егор Алексеевич
6.	Y	Ермаков Марк Михайлович
7.	E	Пересыпкин Станислав
8.	N	Фоменко Елизавета
9.	F	Шевченко Мария
10.	Z	Цао Цзыхэн
11.	W	Е Чэнпин