Task №2
STATIC PLANE THERMAL CONDUCTIVITY PROBLEM

Individual assignments: plates in shape of letters.

Consider a plane stationary thermal conductivity problem for a plate in a shape of the given letter. Take the geometrical dimensions of the letter similar to those of the example problem. Note that the boundaries of the domain should contain both elliptical and arc (circumferential*) segments. The bottom edges of the letter should be subjected to heating with prescribed temperature values and the top edges should be subjected to heat transfer. If possible, take advantage of symmetry when building the domain. Consider the plate to be made of any homogeneous isotropic material. The objective is to conduct thermal analysis and define the temperature and the heat flux vector distribution. Perform computations in ANSYS (command mode) and FlexPDE, and compare the results. In Ansys, estimate convergence of results (temperature and thermal flux) for different sizes of finite element mesh and different shapes and approximation order of finite elements (linear 4 node quadrilateral, quadratic 8 node quadrilateral, 6 node triangle). Find optimal parameters for the finite element mesh. Present a report.

*Note. Circumferential arc segments in ANSYS can be created by LARC command LARC (see examples in the folder «Знакомство с ANSYS – плоская геометрия»). Elliptical arc segments can be constructed in local elliptical coordinate system by L command. In FlexPDE, ARC operator can build both circumferential and elliptical arc segments.

Requirements to the report.

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 and in FlexPDE. 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 temperature distribution
- picture of the heat flux vector distribution
- picture of the distribution of the heat flux vector magnitude
- conclusions on the results

Table 1. Suggestions for domain shape.

Variant No.	Domain shape	Student name
1	α	Бобовников Николай Алексеевич
2	β	Габричидзе Лука
3	δ	Гбамметон Шарль Жюдикаель (Charles Gbammeton)
4	ε	Гладкова Ксения
5	θ	Дремов Егор Алексеевич
6	ω	Ермаков Марк Михайлович
7	λ	Пересыпкин Станислав
8	μ	Шевченко Мария
9	ρ	Цао Цзыхэн
10	σ	Е Чэнпин
11	τ	Зезекало Виктор Анатольевич