

Task №3

CALCULATION OF NATURAL FREQUENCIES AND STEADY-STATE OSCILLATIONS

Individual tasks – plates in shape of letters.

Consider a problem of a plate tension for the plate in the shape of the letter from practical assignment 1. The bottom edges of the letter should be rigidly fixed. Take the geometrical dimensions of the letter similar to those of the example problem. If possible, take advantage of symmetry when building the domain. Consider the plate to be made of two different elastic isotropic materials. The objective is to conduct modal and harmonic analysis in an assumption of plane stress. Perform computations in ANSYS (command mode) and FlexPDE, and compare the results. Compare different variants of loading to determine how the loading type affects the results of the resonance frequency calculation and the resulting pictures of deformed shapes. Check the convergence (accuracy of the natural and resonance frequency calculation) by varying the mesh density. 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 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 (for modal and harmonic analyses)
- Text file with the values of the natural frequencies
- pictures of the mode shapes
- pictures of the deformed shapes at the resonance frequencies
- graph of amplitude-frequency response for a given node

Table 1

Программа ММ (математическое и программное обеспечение вычислительных машин) – все

| № задания | Вид области | ФИО студента |
|-----------|-------------|------------------------------|
| 1 | V | Битюцкий Михаил Сергеевич |
| 2 | M | Борисенко Иван Алексеевич |
| 3 | Z | Бротский Ярослав Игоревич |
| 4 | F | Васильев Андрей Владимирович |
| 5 | Δ | Говорина Людмила Андреевна |
| 6 | W | Гончаров Андрей Сергеевич |
| 7 | N | Григорян Арутюн Камоевич |
| 8 | A | Ефимов Виктор Александрович |
| 9 | Щ | Затона Дмитрий Дмитриевич |
| 10 | Л | Золотов Никита Борисович |

| | | |
|----|---|--------------------------------|
| 11 | Ц | Зубков Юрий Николаевич |
| 12 | К | Каренькова Ирина Васильевна |
| 13 | Д | Коновалов Артем Дмитриевич |
| 14 | П | Лавуренко Илья Вениаминович |
| 15 | Ш | Морозова Юлия Александровна |
| 16 | І | Резван Семен Андреевич |
| 17 | У | Рожковецкий Александр Олегович |
| 18 | Х | Саямов Сергей Михайлович |
| 19 | Г | Таранов Даниил Николаевич |
| 20 | Ғ | Храмцов Максим Валерьевич |
| 21 | Σ | Чуб Анастасия Сергеевна |
| 22 | Е | Чубенко Иван Николаевич |
| 23 | Н | Шалимов Антон Валерьевич |
| 24 | Т | Петренко Дарья |